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The Role of 2D and Virtual Reality Marketing in Influencing Attitudes and Purchase Intention of Customers – An Empirical Analysis of the Mediated Effect of Telepresence

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Executive Summary

The goal of this study is to investigate the impact virtual reality can have on advertising. The variables chosen to measure this impact were attitudes toward the ad and the brand, as well as purchase intentions. Given the embryonic state of the technology, this study aims at disentangling concepts only reserved up until now to technical and psychological departments, so that they can be used by marketing researchers and practitioners.

First and foremost, one must understand virtual reality is an experience. Experiences are, in fact, being searched more and more by consumers as digitalization rapidly thins the material significance of products (in some cases, even making it totally irrelevant). Indeed, these are exciting times to be in the branch of experiential marketing, as markets are starting to see the rise of an experience economy (Pine & Gilmore, 1998).

In fact, experiences can be the key to spread awareness of a brand, creating the desire of consuming the product, and ultimately leading to an action of purchase (Smilansky, 2009). An example of this is Patrón, a spirits company which collected over 145 million earned media impressions from the press just with one virtual reality campaign – the one that was actually used in the present study.

To unravel the mechanisms which make a virtual reality experience so special, one must therefore understand the key concept of telepresence, regarded as the feeling of being in a different environment than the physical one the individual is in. The campaign of Patrón, for instance, leads the user to feel he or she is actually in Mexico, assisting to the production of Patrón's tequila.

What makes the creation of this feeling is a combination of features, which generates what is known as immersion – the independent variable in this study. These features were grouped in two main constructs: vividness and interactivity – vividness being the way information is displayed to the senses, while interactivity relating to the extent to which individuals can modify the environment they are in. Previous empirical research seems to suggest, however, that some features are more important than others, such as tracking level, stereoscopic vision, and field of view (Cummings & Bailenson, 2015) – therefore, the choice of the virtual reality headset for the experiment in this study was made based on those three.

In this sense, the manipulation of immersion was done by creating a virtual reality and a 2D condition. It was then hypothesized that virtual reality would have a more positive impact than a regular 2D video on (1) telepresence, (2) attitude toward the ad,

(3) attitude toward the brand, and (4) purchase intention – with (5) attitude toward the ad also positively impacting the attitude toward the brand and, in turn, (6) attitude toward the brand positively affecting purchase intention.

To test these hypotheses, a random sample of 100 students was collected in a Portuguese and German business schools. As mentioned, the campaign used was made by Patrón, called "The Art of Patrón", available in both virtual reality and 2D formats. The results of the experiment verified all previous hypotheses with the exception being the one that predicted that virtual reality would result in more favourable attitudes toward the ad than 2D.

Many conclusions can be drawn from these results. First of all, it seems virtual reality does make a significant difference in submerging consumers in the virtual environments it provides. It also seems that, through this effect on telepresence, virtual reality has a significant impact on creating attitudes towards the brand and purchase intentions – proving its ability to shape consumer behaviour. Regarding attitudes toward the ad, it was argued that measurement limitations as well as the presence of a ceiling effect may have caused the outcome.

What is puzzling here is that a difference in brand attitude was observed, but not in ad attitudes – possibly giving evidence of the presence of other variables such as consumer innovativeness, that is, the mere fact virtual reality is perceived as a novelty among consumers, may lead directly to the creation of favourable attitudes toward the brand and to a purchase intention. This breaks new grounds for further studies, as more research is needed to truly understand whether virtual reality increases purchase intentions above and beyond mere novelty.

The managerial implications are also numerous since it seems virtual reality is able to engage much more consumers than 2D technology. However, it is crucial to set the right balance of choice of headset, content, and budget – more so given that a virtual reality campaign can range from $10,000 to a hefty amount of $500,000. Nevertheless, the benefits go from increased purchase intentions, creation of word-of-mouth, and the capacity of causing an ever-lasting impact at a personal level, which makes it a medium not to be disregarded by brands and marketing practitioners.

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1 Introduction

Virtual reality has been one of the most discussed topics recently among technology researchers and practitioners. It is defined as a set of input technologies and devices which, when combined, create highly immersive virtual worlds which individuals can interact with and experience through different senses (Biocca & Delaney, 1995; Mandal, 2013). Recently, this type of devices came in the format of head-mounted displays with features such as advanced tracking methods, stereoscopic images, or wide fields of view – which paved the path for a new communication medium (Steuer, 1992).

However, some novel communication technologies are only small refinements of existing technologies. For instance, high-definition television (HDTV) – with resolutions such as 4K, 5K and more – brings incredibly detailed images into the consumer's home, but, impressive as it is, HDTV is just a refinement, not a complete breakthrough in the way people communicate. That is not the case with virtual reality, as it has the potential to be a catalyst for a major revolution in the way humans communicate with each other and with machines (Biocca, 1992). In fact, already in 1991, virtual reality was seen as the "ultimate form of the interaction between humans and machines" (Krueger, 1991, p. 7).

What distinguishes virtual reality from other technologies is its goal: it aims at substituting the entire perception of the real world with a virtually generated representation. For this reason, it is regarded as a highly sensorial experience, with some virtual reality arrangements including (besides sight stimuli), sound, touch, taste and even smell. This creates a sense of *presence* as if individuals were visiting a new world rather than just seeing it (Coyle & Thorson, 2001).

As a result, these days represent an era of transition, where systems are being designed with the goal of immersing students, tourists, moviegoers, videogame players, and even corporate collaborators into virtual media experiences which feel just like real ones – up until now, no other technology had been able to accomplish this (Cummings & Bailenson, 2015). In addition, headsets and development costs have been becoming more and more accessible, bringing the technology to the masses.

As such, the technology has caught the attention of marketing practitioners, always searching for opportunities to grab the attention of customers in new and creative ways. Some examples include Honda, which used virtual reality to cause an impact in a car launch; the campaign for the 100th anniversary of Coca-Cola with their brand values as the main message; or Adidas, which used virtual reality to educate the consumer about their current product line. In fact, advertising has always evolved along with technology,

from traditional advertising to more interactive and digital advertising, so why would not this be an incredible opportunity for marketing?

Not so fast. As of now, there is a gap between practice and academia. While virtual reality has been analysed extensively in research by authors in cognitive neuroscience, psychology, and technology-oriented research departments, direct implications for marketing are still fairly unknown, as very few studies were conducted in this area. One of the most recent ones was done by Van Kerrebroeck, Brengman, and Willems (2017) and investigates the effect of recent developments in virtual reality on marketing concepts such as attitudes and intentions, through the comparison of 2D and virtual reality videos – which is why it will be considered as the major benchmark for the present study, due to the lack of other alternatives.

Van Kerrebroeck et al. (2017) discovered that virtual reality seems to have an impact on attitudes toward the ad and the brand, as well as purchase intention – however, their study presents some methodological limitations which may restrict the internal validity of the conclusions. Moreover, the device used for representing virtual reality was the most basic one on the market, which brings the question of how would the results be affected by using a more technologically advanced headset.

Therefore, this study aims at resolving the most crucial methodological limitations of the aforementioned study, while using a highly advanced virtual reality headset to check if the difference is noticeable, compared with a cheaper one. From a broader perspective, the objective is to understand if virtual reality, in fact, lives up to its expectations and if the investment in the technology pays off with substantial gains for marketing practitioners. This will be accomplished by investigating the impact of virtual reality on three components: (1) attitude toward the ad, (2) attitude toward the brand, and (3) purchase intention – having as a mediating effect, the concept of telepresence.

1.1 Structure

This study starts with a theoretical backdrop divided into three main sections, which present a funnel structure – from general, to specific.

The first section is about experiences and how marketing is incorporating them into its practices, as virtual reality is an experience in itself. This section starts with the new demand of customers for experiences, creating an “experience economy” (chapter 2.1). Then, experience is conceptualized in its essence (chapter 2.2) and categorized into different types, in the context of marketing (chapter 2.3). Next, experiential marketing is

defined as the field responsible for dealing with experiences delivered to consumers (chapter 2.4). The section is then wrapped up with the role that technology plays when designing experiences in the context of experiential marketing, giving an emphasis on virtual reality (chapter 2.5).

The second section is reserved for investigating virtual reality as a technology. It starts with a brief historical background, the current state of the industry, and future predictions of growth (chapter 3.1). Then, virtual reality is conceptualized and the wording to be used is clarified when referring to this technology, which can sometimes be misleading (chapter 3.2). Afterwards, the key construct which differentiates virtual reality from all other technologies – telepresence – is described in detail (chapter 3.3), as well as its antecedents: vividness (chapter 3.4.1), interactivity (chapter 3.4.2), and immersion (chapter 3.4.3). The latter is often confused with telepresence, so the differences between the two are highlighted, giving special focus to the objectivity of immersion and subjectivity of telepresence. This section is wrapped up with the question of how much immersion should one provide to accomplish a good level of telepresence, arguing that different levels of immersion may lead to the same level of telepresence (chapter 3.5).

The literature review ends up with a final and third section, which deals with the intersection of experiential marketing and virtual reality. Specifically, the study of Van Kerrebroeck et al. (2017) is explained in detail, as it served as a benchmark for this research for being one of the few empirical studies which deals with the influence of recent virtual reality technology in marketing (chapter 4).

The second half of this study includes the practical investigation conducted and starts with the hypothesis formulation and description of the conceptual model used (chapter 5). Then, the description of the methodology used is broken down into five subchapters: the research design (chapter 6.1) where it is explained how each condition was configured according to the necessities; the sampling and participant information (chapter 6.2) describes precisely the demographics of the sample used; the stimulus (chapter 6.3) is where the requirements used to ensure the internal validity of the study are clarified; the procedures (chapter 6.4) relate to process participants would have to go through when engaging in the experiment; and lastly, dependent measures (chapter 6.5) give an overview of the variables telepresence, attitudes toward the ad, attitude toward the brand, and purchase intention, and how they were measured in the present study.

The results are then presented through an analysis of each item and the reliability of the scales used (chapter 7.1), hypothesis testing (chapter 7.2), a mediation analysis (chapter 7.3) and, finally, an additional analysis considering the impact of gender for the model (chapter 7.4).

The results are then debated in the general discussion (chapter 8) and arguments are presented – particularly because not all hypothesis got verified after the experiment. Evidently, this brings theoretical (chapter 9.1) and managerial (9.2) implications, which are presented afterwards.

Finally, the limitations (chapter 10) and directions for future research (chapter 11) are presented, with a conclusion (chapter 12) wrapping up the study.

2 Developing the Ultimate Experience in Marketing

2.1 The Experience Economy

Virtual reality is said to be able to immerse individuals in its content like any other technology, which, evidently, can have a great impact on how experiences are felt by individuals. Therefore, being virtual reality an experience, one must first understand what an experience is and why would it be relevant in a marketing context.

In fact, experiences are starting to be seen as the ultimate stage of delivering value. Instead of bombarding consumers with repetitive, and even intrusive, communication, brands are starting to understand that, to be remembered, they must establish a relationship of trust and provide a clear value to their targeted audiences. Ultimately, brands understood that the winner is not who shouts the loudest, but the one who is capable of providing experiences which stick in consumers mind (Smilansky, 2009).

Already in 1999, Schmitt stated markets were in the middle of a revolution in this sense (Schmitt, 1999a). In fact, the importance of experiences is growing so dramatically that not just marketing communications are being impacted, but whole businesses are being shifted. Pine and Gilmore (1998) write about the *experience economy*, as the last stage in the "progression of economic value".

In the very beginning of times, the authors describe that all economies started as agrarian, with the concept of product itself restricted to simple and raw commodities. Eventually, with the industrial revolution, products started to be seen as goods, which could be manufactured and stored. When the working force started moving into the third sector in the XX century, products started becoming more and more intangible, turning into services. Today, consumers are seeking something more than services – they want personal and meaningful experiences, rather than anything else. They are also willing to pay more for those experiences (Pine & Gilmore, 1998).

Take the example of coffee. When extracted from nature, as a commodity, the beans required to produce a cup are worth roughly 3 cents. In a supermarket, when treated as a good and after having been ground, filtered and packaged, it can cost an average of 15 cents. The service of brewing that same coffee in a regular cafe may cost you 1 euro. However, after surrounding that service with the cosy ambience of a Starbucks, it allows the company to charge up to 5 euros for that very same cup of coffee.

2.2 Conceptualizing Experience

In research, however, the concept of experience is not as consensual as one might think when compared with concepts such as choice, attitudes, consumer satisfaction, or brand equity.

First, there is a gap between what experience means in the common sense of the word and in its commercial use. If one takes a more pragmatic approach, experience can be defined as "something that happens to you that affects how you feel", as stated by the Cambridge Advanced Learner's Dictionary (2013). However, if this idea would have to be extended for commercial use, that would mean every single act of consumption or purchase would indicate an experience – which some authors do not agree with. In this context, Pine and Gilmore (1998) describe experiences as something "memorable" (p. 98), while Schmitt (1999b) defines them as events caused by exposure to certain stimuli and meant to surround the entire being, by appealing to all his or her senses. Conversely, other researchers such as Carù and Cova (2003) suggest that this view is romanticized, arguing experience should be seen as a subjective episode, not necessarily extraordinary. In fact, they defend that by getting obsessed with creating extraordinary experiences meant to appeal consumers in a certain specific way, brands are taking away the opportunity for consumers to construct their own experiences with the product.

Second, the term experience, in some languages, may refer to the past (regarding the knowledge gathered over time) and ongoing perception, at the same time – that is the case of English and Romanic languages such as Portuguese, Spanish or Italian. On the other hand, German distinguishes between *erfahrung* and *erlebnis*, and Japanese between *keiken* and *taiken*, to relate to those different ideas. Therefore, it is important to clarify that in this study (and most of previous business research) the term experience refers to the present moment – when consumers develop perceptions, feelings and thoughts when encountering brands and products – together with the memory of those experiences (Schmitt, 2011).

Third and lastly, consumers go through several different types of experiences when buying a product, as described by Arnould, Price, and Zinkhan (2002). Everything starts with a "pre-consumption experience", where the consumer searches and makes plans about the product, probably even day-dreaming about it. The next phase, the "purchase experience", involves the choice, contact with salespeople, payment, package and the physical encounter with the product and environment. The "core consumption experience" itself, relates to the feeling of using the product, satisfaction (or

dissatisfaction) and the associated changes in the consumer. Lastly, the "remembered consumption experience" and possible "nostalgia experience" is linked with the memories created, being the latter often based on personal stories or shared moments with friends and family (Arnould et al., 2002).

In conclusion, experience is definitely a complex and layered construct, which will probably never be conceptualized in one single word which covers all its nuances. For this study, the definition of Brakus, Schmitt and Zarantonello (2009) will be applied, as they make an important distinction between utilitarian and brand experiences.

Utilitarian experiences include the several stages defined by Arnould et al. (2002), while brand experiences are several specific brand-related stimuli, which can be present across all the stages. These brand-related stimuli can include colours, shapes, typefaces, slogans, mascots, and brand characters, which appear as part of a brand's design and identity. This type of experience can be presented through marketing communications (such as advertisements), environments in which the brand is sold or marketed (that is, stores or events) or packaging, for instance. Overall, it is regarded as the main source of subjectivity in internal responses from consumers. For this study, this distinction is particularly relevant, since the effect of interest is precisely the one experiences have on brands.

Therefore, brand experience is conceptualized by Brakus et al. (2009) as the "subjective, internal consumer responses (sensations, feelings, and cognitions) and behavioural responses evoked by brand-related stimuli that are part of a brand's design and identity, packaging, communications, and environments" (Brakus et al., 2009, p. 53).

These brand experiences can vary based on intensity, in valence (that is, some experiences may be more positive than others, or even negative) and on duration (meaning some are short-lived and others long lasting, possibly creating nostalgia). As matter of fact, over time, brand experiences can shape new behaviours of consumers, orienting the paradigm of consumer satisfaction to consumer sensations and sense-making (Reichheld, Teal & Smith,1996; Oliver, 1997; Pencarelli & Forlani, 2018).

2.3 Categories of Brand Experiences

In fact, as Brakus et al. (2009) would also discover, brand experiences have an impact on important marketing concepts, namely, brand personality, consumer satisfaction, and loyalty. Particularly, it has a strong influence on satisfaction, through brand personality, and on brand personality itself (Brakus et al., 2009).

The authors also developed an experience scale based on the dimensions defined by Schmitt (1999a), (1) sensory, (2) affective, (3) intellectual, (4) behavioural, and (5) social.

Sensory experiences have as major objective appealing to senses, with the objective of stimulating sight, sound, touch, taste and smell (Schmitt, 1999a). Recent experiences using virtual reality to recreate virtual worlds are a great example of this.

Affective experiences have a special focus on developing inner feelings and emotions, which can go from mildly positive moods (such as the one felt when buying a durable good in a supermarket) to strong emotions of pride and joy (for instance a special event for fans and the community of a certain brand).

Intellectual experiences are meant to make the consumer think, creating cognitive and problem-solving processes. The trigger to capture consumer attention is usually made through surprise, intrigue and provocation. An example of it is games developed by brands in order to engage its consumers.

Behavioural experiences aim at showing the consumers different ways of doing things, alternative lifestyles and interactions. Changes in lifestyle tend to be more inspirational and often motivated by role models. An example of this type of experiences is social marketing campaigns, meant to convince consumers into changing habits or alert them to certain situations.

Social experiences are meant to connect individuals with something outside of their private state, such as the future "ideal self" (self-improvement), their culture, or their country.

Additionally, Schimitt (1999a) mentions that these dimensions are "circumscribed but are not self-contained structures" (p. 62), meaning that they can overlap and be connected in certain experiences. A virtual reality experience, for instance, can be highly sensorial, but at the same time be used to create affective or cognitive stimulations.

The scale developed by Brakus et al. (2009) had as main objective validating the dimensions above described by focusing on the subjective side of an experience, rather than its objective goal – that is, the degree to which the consumer felt an experience with the brand was sensory, affective, intellectual, behavioural, or social, rather than labelling the actual content of the experience in an objective way.

After 6 empirical studies, Brakus (1999a) ended up selecting just sensory, affective, intellectual, and behavioural as the relevant categories, since the findings for

the social experiences suggested that these tend to be perceived most of the time as strongly emotional (therefore, they were merged into affective).

This is relevant for the present study as it shows that most categories of experience have a strong direct effect on defining brand personality as well as a significant indirect effect on satisfaction and loyalty. Overall, this seems to point out that by developing virtual reality experiences focused on the brand, there is potential to impact how consumers perceive a brand and, ultimately, to influence their behaviour.

2.4 Experiential Marketing: Establishing a Connection with Consumers

Evidently, these are great news for the recent field of experiential marketing. In fact, trends such as digitalization resulted in the rapid decrease of material significance in some products and for some target groups (sometimes even disappearing entirely), which requires an adaption of strategies, processes, and guiding principles is required. In fact, Pencarelli and Forlani (2018) state that companies have now a need to rethink their offers and communications, transforming products from mere outputs with a predominantly functional value into solutions with a meaningful amount of immateriality and experiential value.

To accomplish this, Schmitt (2003) introduces the concept of customer experience management: the customer-centric process of dealing with all the experience of customers when consuming a product or brand. Experiential marketing is precisely the emerging branch in marketing which aims at developing a platform capable of offering an experiential value promise by focusing on customer experience management (Schmitt, 1999a; Pencarelli & Forlani, 2018). The core products are still goods and services, but experiences come as enriching elements of value delivery (Pencarelli & Forlani, 2018). When developing campaigns in this field, Smilansky (2009) highlights the importance of having a two-way communication in real time between the brand and the targeted audience, basically featuring a "*live brand experience*" (p. 6) in its essence.

One aspect that may create confusion at this point is the difference between event marketing and experiential marketing. The former is face-to-face and belongs to experiential marketing (even though not exclusively), while experiential marketing itself is a methodology that utilizes brand experiences at its core (involving both face-to-face and remote communications), amplifying it through an idea of dialogue between consumer and brand. The main objective is to bring brand personalities to life (Smilansky, 2009).

Overall, Smilansky (2009) explains the relevance of designing brand experiences through a set of stages: (1) awareness, (2) interest, (3) desire, and (4) action.

Starting with *awareness*, one may think these live brand experiences have limited reach and are difficult to scale, therefore are not suitable for creating brand awareness – but that is not the truth. Word-of-mouth is a key outcome of experiences and research shows it is highly likely consumers that went through them tell their peers about it, in fact, up to an average of 17 people (Smilansky, 2009). More importantly, it was shown by several scholars that word-of-mouth is one of the most persuasive ways of communication, being up to nine times as effective as traditional advertisement at converting unfavourable or neutral predispositions into positive attitudes (Day, 1971; Herr, Kardes, & Kim, 1991).

Brand experiences can also be widely used to generate *interest* among consumers, not only by showcasing advantages and benefits of the products, but most importantly opening an opportunity for dialogue with the brand. What a better way to convey the brand personality and establish a relationship than through memorable and creative experiences? Regardless of the nature of the product, if a brand is able to get its core values into the everyday life of its customers in a pleasant interaction, it may even convert a customer into an advocate (Smilansky, 2009).

Likewise, experiences can also be used to project *desire* into the target audience, by inducing the subconscious idea that using the product or service will bring them the lifestyle they want. This will lead consumers to eventually *act* and, in fact, research shows that brand experiences are more likely to drive purchase decisions than most of other marketing channels (Smilansky, 2009).

In this case, virtual reality is a great example of how a brand can benefit from experiences. For instance, Patrón (a brand for spiritual drinks) managed to collect over 145 million earned media impressions from the press just with one virtual reality campaign (the one which will actually be used in the experiment of this study) – proving the potential of these particular experiences to create awareness. In turn, it is expected that this generates interest and desire to consume the product among individuals, but very few studies focused on the role that virtual reality plays in developing these, which is why the present research will focus on unravelling these mechanisms.

2.5 The Importance of Technology in Experiential Marketing

Indeed, technology has facilitated the design of breakthrough experiences in ways few imagined possible in the last century. In fact, it can be a great catalyst to capture the attention of your target audience – the first stage necessary to influence consumer behaviour (Schiffman, Kanuk & Hansen, 2010; Kroeber-Riel & Gröppel-Klein, 2013). Not only that, it can also create new ways for consumers to learn a brand's message, interact with it, and establish a dialogue.

Arguably, the medium which impacted the most not only the field of marketing but society as a whole was the Internet. It brought email, discussion groups such as forums and blogs, multiplayer games, chats, file transfers, e-commerce, and easy access to global information (Hoffman & Novak, 1996). Logically, this poses a great opportunity for the creation of experiences for consumers. As already mentioned, experiences do not have to be solely face-to-face – they can happen remotely. Therefore, the internet allows multiple interactions. For instance, Schlosser (2003) studied how consumers react when they are able to interact with different types of information displayed about a product (for instance, "to-the-point" textual information or a more engaging video) on the internet. The author highlighted an often-overlooked aspect which is that not all consumers are searching for experiences – rather, some may just want quick access to information about the product.

Li, Daugherty, and Biocca (2002) studied how 3D advertising on the Web in the form of virtual mock-ups of the product (for instance, a virtual representation of a camera where you can rotate, move in, and move out) impacts product knowledge, brand attitude and purchase intentions. The authors found out that a more interactable representation of the product, in this case 3D, creates a feeling in consumers as if they were dealing with a real product when compared with a 2D representation. This feeling is called telepresence and will be key to this study – therefore it will be explained in the following chapters.

Klein (2003) also showed that in virtual experiences (in this case, websites) user interactivity and media richness have a positive impact on influencing consumer responses, leading to stronger beliefs and attitudes than less realistic experiences when it comes to products. Again, this study considered the mediating effect of telepresence. However, before explaining this construct, it is important to first frame the technology in study, since telepresence is a feeling which can be felt with nearly every communication medium.

In fact, all the recent developments in different mediums, technology platforms, and formats raise the question of whether these technologies provide significant changes

in market behaviours or whether they are just simple extensions of existing trends. According to Saren, Harwood, Ward and Venkatesh (2013), one of the fields which definitely requires further research is virtual reality. The market for this technology has been booming, showing its potential in countless different ways – from gaming, to education, to training of employees, to social interaction, or even in curating phobias. In marketing, however, Smilansky (2017) also highlights the importance of incorporating it in a way that it does not seem gimmicky or simply opportunistic.

As this medium can turn out to be quite complex for non-technology-oriented researchers and practitioners, this study aims precisely at providing marketers a comprehensive view on virtual reality and how can brands incorporate it in their communication strategy.

3 The Use of Virtual Reality for the Design of Experiences

3.1 Historical Background of Virtual Reality

One may associate virtual reality as a new breakthrough technology, however, its foundations come up as early as the 19th century. Sir Charles Wheatstone (1838), an English scientist, discovered in his research that the human eye can be tricked to process a three-dimensional image by converging a pair of two-dimensional images with a minor deviation in perspective, creating a sense of depth. This illusion was coined as stereoscopy and could be accomplished by using a stereoscope, also an invention of Wheatstone, which used a pair of mirrors positioned 45 degrees to the user's eyes.

Almost 12 years later, the Scottish scientist Sir David Brewster created the first handheld device which created 3D images using the concept invented by Wheatstone: the lenticular stereoscope. The device was very well received by the public and even Queen Victoria ended greatly appreciating it. 250,000 devices were produced and sold in a short period of time, giving birth to the new category of 3D photography (Zone, 1996).

Just when the lenticular stereoscope began to decline in the late 1930s, another important advancement would be made by the German William Gruber, in 1939, that would revitalize the technology. Using Kodak's first flexible 35-millimeter film, the new device – named View-Master – brought moving 3D images to the industry. In spite of the innovation, the project faced several growth challenges due to World War II, but eventually received government support for military use of the technology and managed to survive. After the war, the business boomed, and View-Master (now a company) started producing travelogues, stories and cartoons – surviving to the present day (Zone, 1996).

However, the considered first head-mounted display device of all time would only come in 1968, by the computer scientist Ivan Sutherland. Nicknamed "the Sword of Damocles", it was a large and bulky device which allowed users to experience stereoscopic images produced by a computer, rather than a camera (the first of its kind). It was so heavy that users did not feel comfortable wearing it and so large it had to be attached to the ceiling. In fact, some users even reported fear of bodily harm due to the possibility of breakage of the ceiling mount (Chung et al., 1989). Nevertheless, it was arguably the first system clearly aiming at an immersive experience. In Sutherland's own words: "The screen is a window through which one sees a virtual world. The challenge is to make that world look real, act real, sound real, feel real" (Sutherland, 1965, p. 507).

The challenge imposed by Sutherland is one the industry and researchers are still facing nowadays.

At the beginning of 1990s, headsets became more accessible to the general public, where consumers could play virtual games in arcade machines produced by the Virtuality Group. However, household ownership was still far out of reach.

Efforts to change that paradigm were made by gaming companies, which started developing and prototyping head-mounted displays as well. In fact, Sega showcased in 1993 a device with head tracking, stereo sound, and LCD screens, but it ended up never being launched due to technical problems in production. On the other hand, Nintendo managed to launch in 1995 the Virtual Boy, the first ever portable device that could display 3D graphics, at a price of $180. Despite the release in both Japan and North America, it was also a flop, with the main reasons pointed as the lack of colour in graphics (it only rendered games in red and black), shortage of available games, and the lack of comfort.

The future of virtual reality seemed disastrous, but the technology would have its momentum after 20 years, in the 21st century. Rapid advancements in computer technology, especially in mobile, have boosted development of virtual reality headsets. While tracking sensors are increasingly precise, processors are able to render user's input faster than ever, and graphics are more and more realistic, all wrapped up in a lightweight and increasingly cheap headset. At the moment, key players in the market include Google, Samsung, Sony Computer Entertainment, HTC and Oculus.

Starting in 2014, Google provides a do-it-yourself solution made of cardboard, which uses the consumer smartphone to drive it. Users can easily assemble it themselves for just $15 and the device serves as an introduction of consumers into the world of virtual reality, providing a stereoscopy effect.

With its Gear VR line, Samsung provides a similar solution to Google, in the sense it requires the user's smartphone to work. However, despite being more comfortable than the Google solution, it shares the same lack of high refresh rates and refined tracking systems, resulting in poor image quality and low immersion.

Sony Computer Entertainment launched in 2016 its headset focused on gaming, the PlayStation VR. For $399, it provides an entry point for the considered "high-quality virtual reality", including a consistent build quality, high refresh rates and important gaming franchises supporting it, such as Resident Evil and The Elder Scrolls. So far, it

sold more than 2 million units and turned into the market leader given its affordable price, when compared with Oculus and HTC.

Indeed, both Oculus (acquired by Facebook in 2014 for 2 billion dollars) and HTC are considered the companies driving innovation in the market and, as such, their devices normally carry a more expensive price tag, respectively starting at $399 and $499 for their most basic configurations. Both provide state-of-the-art technologies, improving tracking, providing a convincing stereoscopy effect, and showing images with a level of realism that is truly able to immerse users.

However, the main concern at the moment for the industry is driving costs and prices down, so that it can turn virtual reality into a mass market product. So far, perspectives look impressive, with Statista (n.d.) predicting an exponential growth, reaching 19 billion dollars by 2021.

The technology is evolving so fast that, even though in 2007 virtual reality was seen as having little else application than phobia therapy, military training and entertainment (Bowman & McMahan, 2007), today virtual reality is expected to impact several other activities and industries, such as marketing and business itself, education, healthcare, fashion, construction, engineering, and many more (Virtual Reality Society, n.d.).

3.2 Conceptualizing Virtual Reality

Even though today there is already some consensus regarding the concept of virtual reality, it was not always like this.

The term was first coined by Antonin Artaud (1938/1958), in the context of his book *Le Théâtre et son Double*, where the author uses it to describe the theatre as a "purely fictitious and illusory world" (Artaud, 1938, p. 49). However, the term would only be popularized at the end of the 1980s, by Jaron Lanier, often touted as the "father of virtual reality". As the CEO of VPL, Lanier used the term to describe the company's products, such as head-mounted displays and gloves which allowed users to manipulate objects in cyberspace. Unintentionally, the term got increasingly accepted from an entire emerging industry (Krueger, 1991).

Eventually, some researchers shifted the focus of the term from the hardware to the world it created. For instance, Greenbaum (1992) points to virtual reality as "an alternate world filled with computer-generated images that respond to human movements" (p. 58). On the other hand, communication researchers such as Steuer (1992)

felt the need to describe virtual reality as an experiential concept, that is, "a real or simulated environment in which a perceiver experiences telepresence" (pp. 76-77).

Telepresence is, indeed, a crucial variable in which virtual reality stands out from other communication mediums. However, to more clearly differentiate concepts and be more aligned with recent research and the industry, this study will distinguish (1) virtual reality (sometimes also referred to as virtual environment), (2) virtual world and (3) telepresence. Virtual reality will relate to a set of technologies which – when combined – create a virtual world, while virtual world itself will be the fictitious world generated (Mandal, 2013). Telepresence will be now explained in more detail, as it will be a key variable in this study.

3.3 Presence and Telepresence: The Feeling of Being There

For a convincing world to be created in virtual reality, one needs to feel *present* in its environment. This is particularly relevant for marketing, as it has been empirically shown already that high levels of telepresence tend to lead to meaningful experiences and, in turn, influence consumer behaviour and perceptions (Li et al., 2002; Klein, 2003).

André Bazin, a French film theorist, appears to be the first to coin the concept of presence for research purposes. In 1951, the author publishes an article in Esprit (later translated to English in 1967) stating that to feel the presence of something, it must "come within the actual range of our senses" (p. 96). Bazin suggests that, for instance, by reflecting the presence of an actor through visual and auditory cues, a screen is capable of transmitting a certain sense of presence to its viewers (Bazin, 1951/1967).

Steuer (1992) would provide later on a more straightforward and easier to grasp description of presence: "the experience of one's physical environment . . . the sense of being in an environment" (p. 76). The way individuals experience this feeling includes not only sensory inputs such as sight, hearing or touch, but also past experiences or current concerns (Gibson, 1966).

The concept of presence can, however, be manipulated. When a communication medium is introduced, individuals can be forced to perceive two separate environments simultaneously: the real physical environment and another, mediated and artificial, one. This results in the concept of *telepresence*, conceptualized as "the experience of presence in an environment by means of a communication medium" (Steuer, 1992, p. 76), from reading a novel to experiencing a virtual reality world. In fact, participants who experience high levels of telepresence tend to consider the mediated environments as

places they visited rather than something they saw (Slater, Usoh & Steed, 1994). In its maximum exponential, some authors consider technology may even one day pass some Turing test of reality and replace the physical world completely, but certain imperfect illusions already seem so credible and realistic that they can influence considerably users' reactions and behaviours (Biocca, 1992).

However, presence and telepresence are far from being consensual concepts in research. Several other authors studied the phenomenon of presence in different environments, ending up describing it in different ways.

The first clashing point is due to the fact that the terms are often using interchangeably. It is, indeed, common for presence to be considered as a shortened version of telepresence. For instance, Jacobson (2002) describes presence as "the experience of being engaged by the representation of a virtual world" (p. 1) and Witmer and Singer (1998) as "experiencing the computer-generated environment rather than the actual physical locale" (p. 225). This creates considerable confusion, therefore the wording used in this study will refer to the conceptualizations of Steuer (1992).

The second clashing point has been on how to measure telepresence. Some authors defend it can be measured as an objective variable, through the behaviour and reactions of users (Slater & Wilbur, 1997; Floridi, 2005), while others support the argument it is a fundamentally subjective variable, since it is a feeling which varies from user to user (Steuer, 1992; Lombard & Ditton, 1997; Lee, 2004; Lombard & Jones, 2015). This conception will be further explained in the chapter 3.4.3. of this study.

Other complications include the several ramifications that can be considered inside presence, such as spatial presence, social presence, self-presence, cultural presence, and parapresence. *Spatial presence* relates to the feeling of "being there" and is what researchers mean in most cases when they refer to presence (Laarni et al., 2015; Lombard & Jones, 2015). *Social presence* relates to social entities (human, electronic representation of people, or nonhuman animals, such as pets) and involves the creation of the illusion of face-to-face relationships (Horton & Wohl, 1956; Lombard & Ditton, 1997). *Self-presence* is the extent to which the users perceive a virtual representation of their body, emotions, and identity (for example, avatars) as their own (Ratan, 2013). *Cultural presence* implies that users can also locate themselves, objects and other people in a sociocultural web (Mantovani & Riva, 1999). The least familiar one is *parapresence* and is regarded as the "perception that a person or entity is physically present in one's environment when they are not, and could not logically be" (Lombard & Jones, 2015, p.

26), for instance, phantom limb (Brugger et al., 2000) or widows reporting the presence of their deceased husbands (Conant, 1996).

Understandably, this creates a complex web of concepts which hampers the study of the phenomenon of (tele)presence and makes the standardization of concepts especially complex. For this reason, no clear taxonomy is in place, so Lombard and Jones (2015) suggest that further research should refer to an already existing detailed description of presence. This study, in particular, will use the nomenclature of Steuer (1992) – for theoretical and practical reasons – that is, presence will refer to the feeling of spatial presence in physical terms, while telepresence will be reserved to every time a communication or technology medium is involved that creates a mediated environment.

Still in accordance with Steuer (1992), there are two critical variables which enable telepresence – they are called vividness and interactivity – and will be now explained in the next section.

3.4 Antecedents of Telepresence

3.4.1 Vividness: Making an Experience Sensorial

Vividness is described as "the representational richness of a mediated environment as defined by its formal features, that is, the way in which an environment presents information to the senses" (Steuer, 1992, p. 81). According to the author, the richness of an experience can thus vary depending on: the sensory breadth of the message and its depth.

Breath is the number of sensory channels stimulated. For instance, a brand experience which appeals to sight, sound, and touch is more is vivid than one that only appeals to one's sight (Steuer, 1992; Fortin & Dholakia, 2005).

Depth relates to the quality and resolution presented to each sensory channel. When an individual sees a higher resolution image, that one is perceived as a more vivid image than one with a lower one (Steuer, 1992; Fortin & Dholakia, 2005).

Therefore, when comparing virtual reality to a traditional 2D medium, such as a YouTube video (the conditions exposed in the experiment of this study), the former presents a broader and deeper experience to the user: broader, since it addresses several senses (including the presence of a kinematic and proprioceptive stimuli, that is, being able to look around and having the sensation of moving and being able to fall), and deeper,

given it provides a highly realistic representation of the environment desired (Van Kerrebroeck et al., 2017).

Slater and Wilbur (1997) also suggest that, in addition to breadth and depth, two other variables also increase vividness: inclusiveness and surrounding.

Inclusiveness relates to the level of isolation from the external environment the system can provide to the user. Ideally, a head-mounted display would carry no weight or external sounds around would be completely blocked by headphones, for instance, so that users would not have cues that would remind them of their immediate physical environment (Slater & Wilbur, 1997).

Surrounding relates to the field of view of the user, varying from wide-panoramic to a narrow field of view. The wider the field of view, the more the immersion (Slater & Wilbur, 1997). An example is the difference between a head-mounted display (which normally has between 90 to 120-degrees field of view) and a computer monitor (which presents a narrower field of view of around 30-degrees).

Hence, it will be assumed in this study that vividness is a function of breadth, depth, inclusiveness, and surrounding. Altogether, vividness will be described as the way information is displayed to the senses – in other words, the number of senses covered, the quality of the interaction with each sense, the capacity of isolating the senses to perceive the virtual environment, and the field of view presented (Steuer, 1992; Slater & Wilbur, 1997).

3.4.2 Interactivity: Empowering the User

The other variable which influences telepresence, alongside vividness, is interactivity. *Interactivity* is defined as "the extent to which users can participate in modifying the form and content of a mediated environment in real time" (Steuer, 1992, p. 84). Steuer mentions that many factors contribute to interactivity, but three stand out: speed, range, and mapping.

Speed refers to the response time of the mediated environment in processing the inputs of the user, also known as latency, and is measured in milliseconds.

Range is the number of possible actions a user can perform to manipulate the environment, at any given time.

Mapping is the degree to which the controls the user uses to manipulate the mediated environment feel natural and predictable, for instance, wiggling one's left toe to change the direction of a car versus turning a steering wheel (Steuer, 1992). Slater and

Wilbur (1997) rename mapping as matching, but essentially relate to the same important factor of having an accurate and intuitive matching between the body movements of the user and the change happening in the virtual environment.

The authors, however, introduce the concept of plot. *Plot* is the degree to which a virtual environment can present a story-line that is "self-contained, dynamic, and presents an alternate unfolding sequence of events" (Slater & Wilbur, 1997, p. 605). Most importantly, it relates to the extent to which the user is able to influence and manipulate the unfolding of events in the virtual world (Zeltzer, 1992; Slater & Wilbur, 1997). For instance, a brand experience which presents a storyline with several endings depending on the individual's decisions is more interactive than one with only one possible ending.

With this, the variable interactivity for this study will be a function of speed, range, matching (or mapping), and plot. In other words, interactivity will depend, respectively, on how fast the system can respond to user inputs, on the number of different actions the user will be able to perform, on how intuitive the controls to perform those actions are, and the extent to which the user is able to influence the unfolding sequence of events in the virtual world.

However, similarly to the concept of presence, this definition of interactivity is far from being consensual among researchers (Fortin & Dholakia, 2005). Many other communication researchers have defined interactivity in different ways, by linking it with the notion of feedback (Wiener, 1950), with the degree of relationship between later responses and previous exchanges in a given transmission (Rafaeli, 1988), or the capabilities of communication systems themselves to talk back to a user (Rogers, 1986). While these reflect the traditional view of mediated communication, the definition provided by Steuer focus rather on the role of telepresence, mentioning specifically the capacity of the user to change something and not only receive information back. This brings a virtual world closer to the idea of reality, increasing, ultimately, the feeling of telepresence among individuals (Steuer, 1992) – which is why this one will be used for the purpose of this study.

However, the relationship between vividness and interactivity is often misunderstood and even confused between each other. The key difference is the two-way communication factor of interactivity: in fact, certain mediums can be highly vivid but non-interactive at all such as an IMAX movie or surround sound technology (Fortin & Dholakia, 2005). Conversely, texting with a bot can be highly interactive, but very low in vividness.

3.4.3 Immersion and its Distinction from Telepresence

The combination of vividness and interactivity, however, does not lead directly to the creation of telepresence, but rather to the creation of immersion.

As opposed to the subjectivity of telepresence (the feeling that each person gets of being in another environment), immersion is an objective and quantifiable measure. It is regarded as the extent to which the system has the capacity to replace physical reality with a virtual one (Slater & Wilbur, 1997; Cummings & Bailenson, 2015). In the words of Biocca (1992), it is the "degree to which a virtual environment submerges the perceptual system of the user in virtual stimuli" (p. 25). Therefore, it is likely that an immersive system results in the feeling of telepresence. However, even though both are often confused or interchangeably used, they are fundamentally different (Bowman & McMahan, 2007).

Being telepresence a "perceptual illusion of nonmediation" (Lombard & Ditton, 1997, p. 1) and the psychological state of being in a virtual environment (Slater & Wilbur, 1997), it varies from person to person. For this reason, it will be considered in this study as a subjective measure, dependent on each participant.

Some authors argue there is also an objective component to telepresence, regarded as observable natural behaviours or reactions of users that indicate they are present in the virtual environment. In fact, some authors suggest that if in a given virtual environment users behave in a similar way to what they would in equivalent real circumstances, that can be regarded as a high level of telepresence (Slater & Wilbur, 1997; Floridi, 2005). Some objective measures used are, for instance, vection posture, phycological arousal, and memory tests. However, the meaning of these measures is not consensual. Take the example of body vection: if the user leans forward, that can be interpreted as feeling engaged and present, but leaning back could also indicate feeling present and surprised. Similarly, cases in which a user can clearly remember an experience or only recall a few details can both reflect the feeling of presence of the user (Cummings & Bailenson, 2015). For this reason, telepresence will be described mostly as a subjective variable (Steuer, 1992; Welch, Blackmon, Liu, Mellers, & Stark, 1996; Lombard & Ditton, 1997; Lee, 2004; Lombard & Jones, 2015) and be restricted to that definition in this study for theoretical and practical purposes. For the sake of internal validity as well, the experiment conducted will measure telepresence through self-report.

Therefore, vividness and interactivity increase immersion, which in turn affects telepresence positively. Nonetheless, there are two effects which filter the way vividness

and interactivity are perceived: the experience context and the user's perceptual requirements (Slater & Wilbur, 1997).

The first one has to do with the goal of the experience. Not every experience has the same purpose and requires the same level of vividness and interactivity. Take the example of a virtual reality experience which aims at showcasing the new design of a certain product. In this case, a high-quality visual representation may be more important than auditory rendering. Conversely, advertising a music festival may increase the importance of auditory cues, when compared with visual representation. This may lead to the same levels of telepresence (subjective), even though the parameters for vividness differ in each experience (objective) – the same applies to interactivity. In other words, the coefficient or importance of each sense stimulation and level of interactivity is likely to change from experience to experience (Slater & Wilbur, 1997).

Secondly, each person seems to have different requirements regarding the amount of sensory information needed to enable a successful sense of reality. For instance, for one person the absence of auditory cues may be fundamental, while for another may be hardly noticed (Slater & Wilbur, 1997).

These two layers are responsible for the subjectivity inherent to the concept of telepresence and condition the amount of immersion each person needs to feel displaced of their physical reality. Figure 1 illustrates the whole process leading to telepresence.

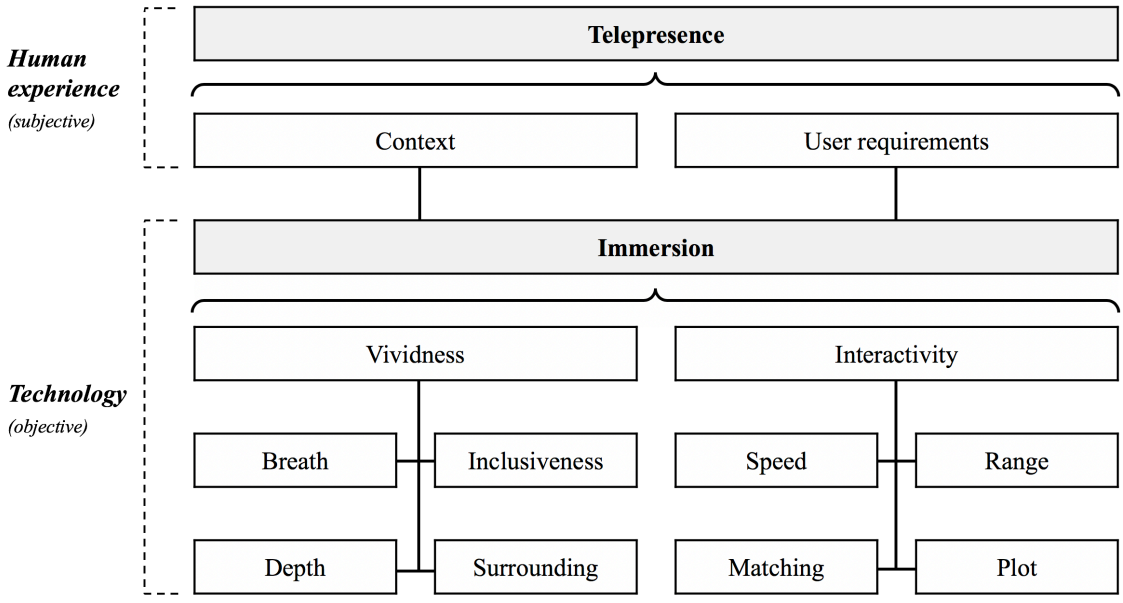

Figure 1. Antecedents of telepresence, as defined by Steuer (1992) and Slater and Wilbur (1997).

3.5 How Much Immersion is Enough?

In spite of the subjectivity of telepresence, one thing is clear in research: the more immersive experiences a system is able to provide, the higher the chances that users will feel telepresence (Slater & Wilbur, 1997; Meehan, Insko, Whitton, & Brooks, 2002; Bowman & McMahan, 2007).

For this reason, one can conclude that developers of virtual reality experiences aiming at high levels of telepresence should strive to develop the most technologically immersive experience. Thankfully, not just computers are gaining more processing and graphical power, as head-mounted displays are getting wider fields of view, better tracking technologies, enriched stereoscopic visuals, and surround sound, while at the same time getting lighter and less cumbersome. This all contributes to greater levels of immersion, as well as more consistent and rich spatial cues which in turn will bring some physicality into virtual environments: users will feel they are situated inside them (Cummings & Bailenson, 2015).

However, all these breakthrough technologies come at a cost. As a matter of fact, most virtual reality experiences still require expensive hardware for certain features such as tracking technology or screen resolution. Not just that, in terms of usability, high immersion hardware requires calibration and may still feel intrusive and burdensome. For this reason, it is crucial for those developing virtual reality experiences (namely brands) to know which features they should focus on, in order to maximize the quality of their experiences for the available budget, in other words, to know "how much benefit does the newer or additional technology really add to users' sense of being physically present" (Cummings & Bailenson, 2015, p. 5).

Therefore, one can ask: how immersive is enough? Cummings and Bailenson (2015) have conducted a meta-analysis composed by 83 empirical studies, which aims at answering this question. For this, the authors had to make some assumptions in order to standardize definitions: similarly to this study, only studies which measured telepresence through self-report were selected; additionally, immersion was considered as largely emphasizing technical configurations and specifications rather than aspects of the content of the experience itself (reflecting its objective nature). Therefore, the following features were considered: tracking level, stereoscopic vision, image quality, field of view, sound quality, update rate, and user perspective. These variables will be now explained and related with the variables in our previous model. Lastly, another category of studies was

defined, which was called overall high versus low immersion (Cummings & Bailenson, 2015).

Tracking level relates to the quality of the input method in terms of how natural the gestures feel to the user or the number of axis tracked (the so-called degrees of freedom in technology-oriented research). Some common examples are eye tracking, head tracking, and position tracking (used to track where the user is inside a room) (Cummings & Bailenson, 2015). This is strongly connected to the variables matching and range of interactivity, previously defined (Steuer, 1992; Slater & Wilbur, 1997).

Stereoscopic vision relates to how the technology presents the image to the user's eyes. Some head-mounted displays show two images, one for each eye, while others only present one (monoscopic visuals). The added benefit of stereoscopic vision is that it provides a sense of depth which allows users to better perceive a 3D environment (Yeh & Silverstein, 1992; Cummings & Bailenson, 2015). This variable can be therefore related with the variable depth (of visual cues), from vividness (Steuer, 1992).

Image quality is a variable that includes resolution, realism, and fidelity of visuals provided. Some common manipulations include standard versus high definition, texture and lighting of graphics, and general level of detail (Cummings & Bailenson, 2015). Logically, this variable can be associated with depth (of visual cues), from vividness (Steuer, 1992).

Field of view includes the degrees to which the user's total view extends. This can be manipulated in head-mounted displays by increasing (or decreasing) the size of the display, for instance (Cummings & Bailenson, 2015). This is closely linked to the variable surrounding, from vividness, in the model previously described (Slater & Wilbur, 1997).

Sound measures the importance of auditory cues for the feeling of telepresence. Common manipulations include presence or absence of all sound, ambient sound or spatialized sound (Cummings & Bailenson, 2015). Given that it measures the importance of the existence of audio rather than its quality per se, it will be included in the variable breadth, from vividness (Steuer, 1992).

Update rate, or latency, is the time the system takes to render inputs of the user into the virtual world, from the moment the input is given to the one when a full-frame of pixels reflecting the associated changes is displayed. For this reason, a high latency can quickly cause a feeling of detachment from the virtual world since the user's motions and orientation take longer to be processed. In some cases, it may even cause disorientation and nausea. In order to avoid this, frame latency is recommended to never be above 20

milliseconds, but recent headsets are already able to provide only 5 milliseconds (Kanter, 2015; Cummings & Bailenson, 2015). This variable can be related to speed of interactivity in the previous model defined (Steuer, 1992) and is "arguably the most important performance metric for virtual reality" (Kanter, 2015).

User perspective refers to the standpoint of the user in the experience, either first person (from the eyes of the virtual body) or third person (from the point of view of a third entity, such as over the shoulder or behind the user's virtual body) (Cummings & Bailenson, 2015). In this study, this will be considered as part of matching, from interactivity (Slater & Wilbur, 1997), where the assumption is that first-person experiences are a good match with the perspective users take in real-life, while third-person ones are not (Steuer, 1992; Slater & Wilbur, 1997).

Lastly, Cummings and Bailenson (2015) describe *overall high versus low* immersion, as a category for studies that manipulated several variables by changing mediums (preventing the isolation of a particular effect). For instance, a study which aims at investigating presence by comparing a head-mounted display with a desktop or a mobile phone falls in this category (Cummings & Bailenson, 2015). Given its specific nature, there is no possible association with the manipulation of a specific variable previously described. In fact, the experiment conducted in the context of the present study would also fall under this category.

The sample was collected among important journals for the study of the phenomenon of presence, being the most common studies the ones comparing different mediums (that is, overall high versus low), followed by those examining tracking level and use of stereoscopic vision. Next, were those comparing field of view, sound quality, and image quality. The least common studies were the ones that manipulated the update rate and user perspective. The range of activities varied from exploring a virtual environment freely, perform a specific task (such as make distance estimations or navigate a route as quickly as possible), or play a videogame. Additionally, all studies included a relatively homogeneous sample of participants, collected among generic convenience samples in their vast majority (Cummings & Bailenson, 2015).

Steuer (1992) and Slater & Wilbur (1997)	Independent variable	K	r (weighted)	N	χ^2	Variance attributable to sampling error (%)
Immersion (all studies)		115	.316	6998	2069.179*	15
Speed	Update rate	4	.529	41	4.391	100
Matching & Range	Tracking level	22	.408	1566	319.772*	8
Matching	Natural versus abstract mapping	7	.360	587	133.295*	6
Range	Many versus some	6	.645	390	44.578*	1
Range	Some versus none	10	.281	645	189.786*	32
Surrounding	Field of view	14	.304	1081	487.886*	5
Depth	Image quality	10	.150	855	259.432*	39
Depth	Stereoscopy	18	.320	928	270.748*	16
Breath	Sound	13	.260	757	202.378*	30
Matching	User perspective	2	.234	72	38.775*	100
-	High vs. low	32	.339	1698	476.491*	30

* $p < .001$

Table 1. Results of meta-analysis conducted by Cummings and Bailenson (2015), with a note on the linkage with variables set by Steuer (1992) and Slater and Wilbur (1997). Adapted from "How immersive is enough? A meta-analysis of the effect of immersive technology on user presence," by J. J. Cummings, & J. N. Bailenson, 2015, Media Psychology, 19(2), p. 22.

Overall, it was concluded by Cummings and Bailenson (2015) that immersion has a medium-sized effect (r = .316) for the creation of telepresence (Cohen, 1988).

The authors suggest, however, that given the small sample (K, which designates the included studies in a meta-analysis, in Table 1) for update rate and user perspective, drawing general conclusions for these variables may be risky. In spite of this, at least the variable update rate is already acknowledged in previous empirical research as extremely important for achieving immersion and presence (Kanter, 2015).

Some results may even be surprising. Image quality and sound, for instance, are suggested to have a small-sized effect on presence (r = .150 and r = .260, respectively). In fact, previous research suggests that a high visual realism does not influence user attention, recognition, or subjective experience, indicating people might not even notice an increase in visual fidelity (Reeves & Nass, 1996).

Conversely, field of view, stereoscopy, and the category overall high versus low immersion led to a medium size-effect (with r = .304, r = .320, and r = .339, respectively).

The variable tracking had, overall, a medium-effect (r = .408) and was divided into three categories. The first one included studies which compared the effect of a natural matching between user inputs and respective changes in the virtual environment to a more abstract one (r = .360). The other two reflected the number of tracking points (that is, degrees of freedom in technical terms) that were measuring the inputs of the user. “Some versus none” had a small effect (r = .281) and included studies which compared situations where users had no control over orientation or navigation (no tracking was being done) with others where there was some degree of tracking. “Many versus some” had the largest effect (r = .645) of all variables on presence and included studies comparing a large set of tracking points with relatively few (Cummings & Bailenson, 2015).

The reason for tracking level showing such a high importance in the process of presence formation may be due to the fact that users gain a better sense of self-location, navigation, and possibilities of actions when systems include multiple tracking points and more finely measure user movements. In fact, the analysis conducted by Cummings and Bailenson (2015) even suggests this is a feature which is worthier of investment than sound or image quality for instance, something the industry has been overly focusing on recently (Kanter, 2015; Cummings & Bailenson, 2015).

Other important variables to consider are field of view and stereoscopy, for similar reasons as tracking. Stereoscopy gives a sense of depth to the images displayed and hence provides a more realistic 3D virtual space in which users can better perceive their relative position. On the other hand, the findings also seem to support that a wider field of view, which more closely resembles the user’s natural field of view, facilitates the self-location within a virtual environment (Cummings & Bailenson, 2015).

Nevertheless, the main insight of this meta-analysis is that, all else equal and given a limited budget, when designing a virtual reality experience, it is advisable that the focus goes to the tracking level, stereoscopic vision, and field of view, instead of focusing on overly realistic visuals and auditory cues (Cummings & Bailenson, 2015). In fact, this was a concern when designing the experiment for this study, as the choice of content and the head-mounted display itself was done based on these findings.

It will also be important when formulating the hypotheses of the model to acknowledge that a difference between platforms should be expected, as the category high versus low immersion suggests. This is due to the use of different technologies – which have limitations in displaying each feature above mentioned – consequently having an impact on telepresence.

Finally, it is important to recognize that there is not a straightforward answer to the question “how much immersion is enough to create a reasonable amount of telepresence?”. In fact, it differs not only on the content of the experience, but also on the specific perceptual requirements of the target group. However, what the meta-analysis of Cummings and Bailenson (2015) seems suggest is that there are certain variables which tend to stand out and should not be disregarded when designing experiences intended to develop telepresence among individuals.

4 The Use of Virtual Reality in Experiential Marketing

The more technology moves forward, the more the sense of telepresence can be enhanced in a "wide variety of virtual realities" (Steuer, 1992, p. 91).

Arguably, immersive virtual reality is one of the few technologies which has the potential to be incredibly vivid, while offering a great amount of interactivity. It is able to provide several depth cues that other technologies are not, in particular, stereo images and head tracking, which allow users to better understand stereopsis and motion parallax in virtual environments. In fact, empirical studies show that, when viewing content in 360-degree through the use of a head-mounted display, individuals report more the feeling of telepresence than when they experience the same virtual environment in a 2D or 3D setting (Welch et al., 1996). Therefore, it is intuitive to conclude that higher levels of immersion can lead to a greater spatial understanding, which in turn can result in greater effectiveness in creating convincing experiences and potentially influencing human behaviour (Bowman & McMahan, 2007).

However, empirical research on the role that virtual reality plays in influencing telepresence and behaviour has been mostly conducted by cognitive neuroscientists, psychologists, and technology-oriented research departments, with very few studies reflecting direct implications to marketing practices. For benchmarking, one of these studies was selected – by Van Kerrebroeck et al. (2017) – as it was published in a renowned journal and provides a clearer comparison to what the present research is aiming for: the study of the impact of virtual reality on marketing practices using telepresence as a mediating construct.

Van Kerrebroeck et al. (2017) framed their study using an adapted conceptual framework from Zeltzer (1992). The framework is represented as a three-dimensional model. The three dimensions are (1) message type, (2) content interactivity, and (3) message representation.

Message type can be either informational or transformational, as marketing communications can differ based on what they aim to convey. Informational advertising presents factual and relevant product and brand data, such as materials used, how to use the product, and other functional features. On the other hand, transformational marketing aims at showing the feeling of using the product and the personality of the brand, for instance, the adventurous spirit one feels when drinking Red Bull or the determination transmitted by Nike's brand (Puto & Wells, 1984; Zeltzer, 1992).

Content interactivity relates to non-interactive or interactive messages. While the former usually relies on static or "fixed"-dynamic images (such as a video), the latter provides to consumers the capacity of interacting and controlling what they are seeing or hearing (Zeltzer, 1992).

Message representation is the format in which the message is presented and, for simplicity, will only be considered as 2D or virtual reality. 2D is what many define as "flat" pictures, with no sense of depth, while virtual reality adds that feature plus others, such as the possibility to look around and having the sensation of moving in the virtual environment. Van Kerrebroeck et al. (2017) also consider 3D in this framework, but it is believed that adds unnecessary complexity to the model as 3D should be considered as a separate category – in fact, past literature sees 3D as interactive 2D representations, for example the case of a website which showcases a 3D interactive representation of a camera which one can rotate or zoom in and out (Li et al., 2002; Klein, 2003).

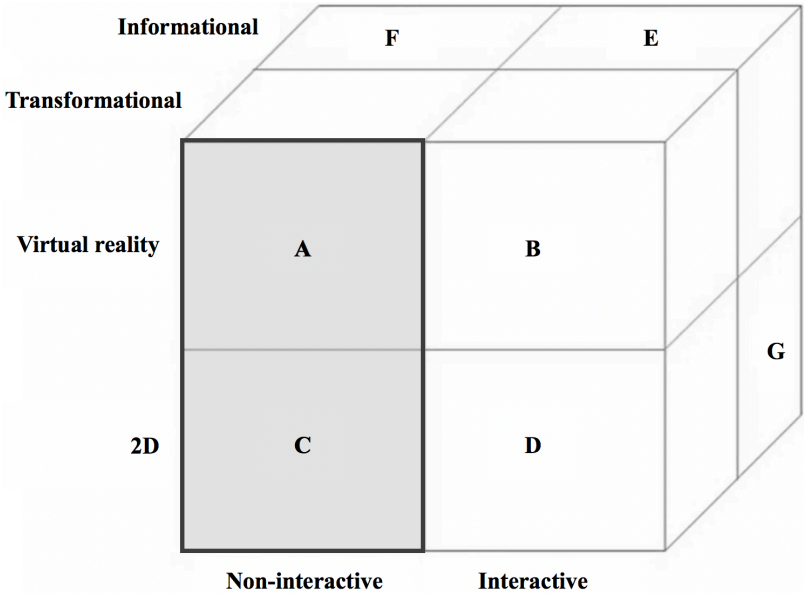

Figure 2. Octants compared in the present study. Adapted from "Autonomy, interaction, and presence," by D. Zeltzer, 1992, *Presence: Teleoperators and Virtual Environments*, *1*(1), p. 129.

Therefore, looking at Figure 2, Van Kerrebroeck et al. (2017) aimed at analysing the comparison between octants A and C. This means the authors were interested in investigating the effect of non-interactive transformational advertising across 2D and virtual reality. The mediated effect studied was telepresence, placing a particular emphasis on vividness in this case, and the marketing concepts chosen were attitudes

toward the ad, attitudes toward the brand, and purchase intentions – the full conceptual model can be seen in Figure 3.

To study the effect, Van Kerrebroeck et al. (2017) divided a sample of 160 Belgian students into two experimental groups. One group of students watched a video on a mobile phone (2D) and the other on a Google Cardboard head-mounted device (virtual reality). The particular video used in the 2D experiment showed landscapes of Yosemite National Park as part of a campaign by North Face, with athletes doing rock climbing. In the virtual reality experiment, a similar video was used – even though not the same one – where individuals could look around in 360-degree degrees.

However, the approach of Van Kerrebroeck et al. (2017) contradicts some of the assumptions of the present study, posing even some limitations in terms of internal validity.

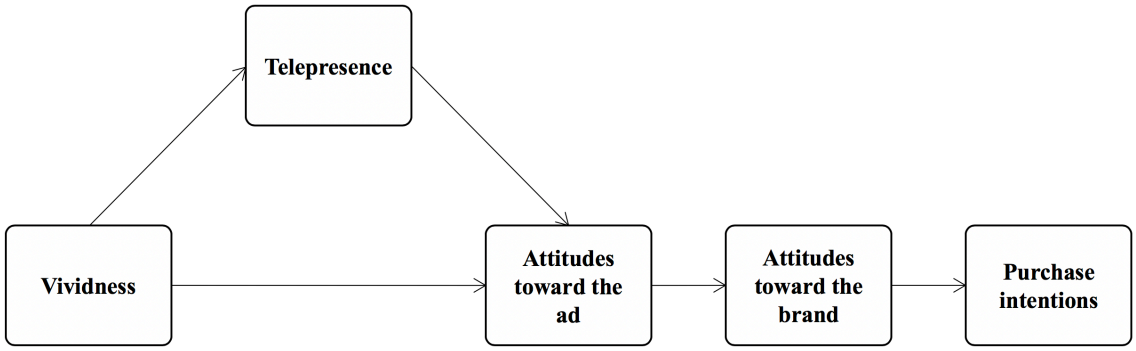

Figure 3. Conceptual model of Van Kerrebroeck et al. (2017). Adapted from "When brands come to life: Experimental research on the vividness effect of virtual reality in transformational marketing communications," by H. Van Kerrebroeck, M. Brengman, & K. Willems, 2017, *Virtual Reality*, *21*(4), p. 183.

Firstly, vividness is considered by the authors as a subjective variable and is measured through self-reporting by participants. This contradicts previous studies, as vividness is mostly defined as an objective variable. In fact, as explained in chapter 3.4.3, vividness can be highly volatile in the sense that different levels of vividness may lead to the same level of telepresence – in other words, the characteristics of each individual experience are what will define the senses that will have a higher importance when creating the feeling of telepresence, such as sound in a virtual concert or sight for showing the design of the product. Therefore, having vividness measured through self-reporting does not convey much information. The present study will prefer to incorporate

immersion instead of vividness, given it is a more comprehensive variable, and refer to it as an objective construct.

Secondly, it is mentioned by Van Kerrebroeck et al. (2017) that the videos, despite being different, were similar in nature. This, however, might not be sufficient to ensure the internal validity of the experiment, as any observed difference could be attributed to the different stimuli rather than the virtual reality versus 2D environment. The present study aims at solving that limitation by showing the exact same video in the different conditions.

Thirdly, the brand used (North Face) is a relatively well-known brand, which may create some preconceived response bias and confounding judgements regarding the brand. This was solved in the present study by choosing a brand none of the participants knew beforehand – the criteria are further explained in chapter 6.3.

As a final note – and while this is not a limitation of the study – the device used for the virtual reality condition is rather limited, with a poor tracking system, a restricted effect of stereoscopy, and a narrower field of view than most headsets, resulting in low immersion. Therefore, it may be interesting to see the effect of using a more advanced head-mounted display, which is why the present study used Oculus Rift (one of the most advanced devices available to the consumer at the moment).

Nevertheless, it should not be disregarded the fact that, still with a low immersion headset, it was reported by Van Kerrebroeck et al. (2017) a higher sense of telepresence from participants who tried virtual reality when compared with 2D, as well as a significant positive influence in attitudes – toward the ad and the brand – as well as in purchasing intentions. As a result, this information will now be used when formulating the hypothesis for the present study.

5 Hypothesis and Proposed Model

The goal of this study is to evaluate the mediating effect of telepresence in the context of a virtual reality versus a regular 2D experience and the respective results on the following key outcome variables: (1) attitude toward the ad, (2) attitude toward the brand, and (3) purchase intentions (Homer, 1990).

This study is positioned as the comparison between the same two octants analysed by Van Kerrebroeck et al. (2017) in Figure 2: octant A and C. This means that the advertising experience used in this study is regarded as transformational (with the main purpose being the creation of a bond with the brand rather than focusing on product characteristics) and non-interactive (in the sense that the consumer is not able to impact the unfolding of the story). However, this study will be more than a replication of the one of Van Kerrebroeck et al. (2017), since it addresses most of the limitations posed by their research (as explained in chapter 4) and refines the methodology. Therefore, an alternative conceptual model is proposed, in Figure 4.

First of all, immersion is manipulated through the use of 2D and virtual reality technologies. As seen in chapter 3.4.3, the present study considers immersion as an objective variable which describes the degree to which a technology is able to replace the physical reality of the user with a virtual world. It derives from two objective variables as well: vividness and interactivity. These variables were not included in the conceptual model, but they are crucial for the final outcome of immersion. On one hand, virtual reality is unquestionably more vivid than 2D, since it brings features such as (1) additional proprioceptive and kinematic stimuli (breath), (2) more detailed images, with even a sense of profundity (depth), (3) an enclosed headset allowing the individual to focus on what is being displayed on screen, and (4) a much wider field of view of 30-degrees versus 110-degrees (Kanter, 2015). On the other hand, even a standard virtual reality video can be considered as being a step ahead in terms of interactivity, given that individuals can look around by moving their head with almost zero latency (translating in higher values for range, mapping and speed). Altogether, this means virtual reality will turn out as a more immersive medium than 2D (Steuer, 1992; Slater & Wilbur, 1997; Cummings & Bailenson, 2015).

In turn, immersion generates telepresence, which is the subjective feeling of being in an environment created by a communication medium. What previous empirical research seems to point at is that a higher value of telepresence should be expected in virtual reality, when compared with 2D, given its higher levels of immersion (Cummings

& Bailenson, 2015). Therefore, the first hypothesis of this study will be that (H1) the level of telepresence is higher for virtual reality than for 2D.

As a consequence, and also based on prior evidence, a higher sense of telepresence is said to magnify user effects – that is, the extent to which a user response to a virtual stimulus resembles its real-world counterpart. In turn, this is said to increase the effectiveness of mediated environments (Welch et al., 1996; Slater & Wilbur, 1997; Li et al., 2002; Cummings & Bailenson, 2015; Van Kerrebroeck et al., 2017). As such, the second, third, and fourth hypotheses were derived from this reasoning: virtual reality is expected to have a more positive impact than 2D on (H2) attitude toward the ad, (H3) attitude toward the brand, and (H4) purchase intentions.

Additionally, the affect transfer hypothesis of Homer (1990) was used to formulate the fifth and sixth hypotheses, which creates a relationship between attitude toward the ad, attitude toward the brand, and purchase intentions. It is, therefore, predicted that (H5) attitude toward the ad positively impacts the attitude toward the brand and, in turn, (H6) attitude toward the brand positively affects purchase intentions.

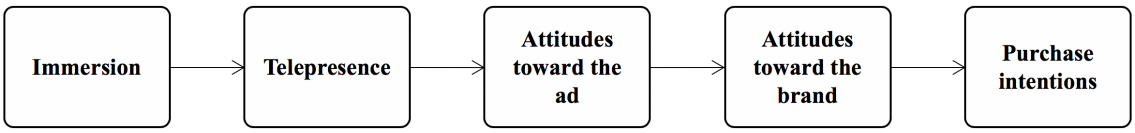

Figure 4. Conceptual model of the present study.

6 Methodology

6.1 Research Design

To test the hypotheses, an experiment was conducted in a laboratory setting among two experimental groups. The manipulation of the independent variable (immersion) was accomplished through the use of two different types of communication mediums: virtual reality and 2D – meaning that a group was assigned to the virtual reality condition and another one to the 2D condition.

The virtual reality video was displayed on the latest Oculus VR headset – the Oculus Rift – known for being one of the most advanced head-mounted displays currently being commercialized in the market. It was chosen based on features which are empirically proven to boost telepresence, as explained in chapter 3.2, such as an advanced tracking system, a high stereoscopy effect, and a wide field of view (Cummings & Bailenson, 2015) – with the added bonus of having built-in headphones and a high-resolution display. The fact that a high-end device was used in this experiment aims precisely at capturing all the potential the technology has to marketing and to see if there are significant gains when compared with less immersive headsets, such as the Google Cardboard, used in other studies (Van Kerrebroeck et al., 2017). However, to power the headset, a computer station had to be rented given its high requirements. The headset itself was provided by a company in the field of virtual reality (VR First). The software chosen to display the video was the Opera browser, as it was the only one able to display video from major video platforms (such as YouTube) on Oculus Rift – in fact, at the time of writing, this software had only been launched nine months prior to the experiment, showing the embryonic state of the technology for consumer purposes.

On the other hand, the 2D video was shown on a regular laptop, in full-screen mode. The sound was provided through headphones.

6.2 Sampling and Participant Information

A total of 100 students participated in this study.

For the 2D condition, 50 university business students (44% female; 56% male; 70% bachelors; 30% masters) were randomly selected with an age above 18 years old, due to the nature of the product category (92% turned out to be between 18 and 24; 8% between 25 and 34). This sample was collected at a Portuguese business school (Nova

School of Business and Economics), which justifies the large representation of Portuguese students (92% Portuguese; 2% Brazilian; 2% Chinese; 2% Indian; 2% Irish).

For the virtual reality condition, another group of 50 university business students was randomly selected (46% female; 54% male; 56% bachelors; 44% masters), with the same age requirements as the previous one (74% turned out to be between 18 and 24; 26% between 25 and 34). This sample was collected at a German business school (EBS Universität für Wirtschaft und Recht), resulting as well in a larger representation of German students (40% German; 2% Canadian; 6% Chinese; 2% Dutch; 18% French; 4% Hungarian; 10% Indian; 4% Italian; 2% South Korean; 2% Pakistani; 2% Russian; 2% Singaporean; 2% Spanish; 2% Swedish; 2% Swiss).

Both groups of subjects were recruited to participate in exchange for compensation of food and drinks, and none of them had heard about the brand Patrón before.

6.3 Stimulus

To investigate the relative impact of both virtual reality and 2D, the experiences needed to (1) be perfectly equivalent in their message, (2) require participants to engage in information processing, and (3) portray an unknown brand to the individual.

The first requirement comes from the need to minimize other effects than strictly the one of interest: the difference between both mediums. Therefore, for the sake of internal validity, the video presented in both experiments was exactly the same, with the only difference being the fact users could look around in the virtual reality video, experiencing several benefits from the technology, such as a sense of depth and a wider field of view. The resolution was also revamped to the maximum available in both settings so that images would have the same level of detail.

The second requirement was necessary in order to ensure participants were engaged in active processing for evaluation of the experience. This is usually achieved in consumer behaviour research by informing participants in the beginning that they will be asked to report their thoughts and opinions after the experience (Kempf & Smith 1998; Li et al., 2002).

The third and last requirement was important to ensure any preconceived response bias was minimized and avoid confounding judgements regarding the brand. Several products and brands were evaluated and considered (for instance footwear, cars, and soft drinks) before the decision of using a spirit drink: tequila, from the brand Patrón. Such a

product was considered appropriate according with (1) the fact the brand chosen was not widely known, (2) the availability of quality material on the internet, (3) the message of the advertisement being mostly transformational, with the main objective being the portray of the feeling of using the product and the personality of the brand, and (4) the experience attributes for the category – that is, the most important attributes of tequila (or spirit drinks in general, for that matter) cannot be completely digitalized such as smell, feel, and taste (Nelson, 1981). The rationale for this last criterion is that, if a virtual reality experience for this type of product is able to create a sense of telepresence among individuals using a regular head-mounted display with just sight and sound, then creating virtual reality experiences for products with attributes which are easier to be digitizable (such as software, music content, or even books) would be easier because those attributes would be more clearly communicated (Klein, 2003).

6.4 Procedures

The experiment was done sequentially and one participant at a time. Each one was given an introductory explanation about the purpose of the study and informed about the questionnaire they would have to fill in at the end of the exercise. Afterwards, they were equipped with the required hardware (either a virtual reality headset or a computer and a pair of headphones) and asked about the comfortability of the set.

Once participants entered the exercise, the video would start playing automatically, guiding the individual through the hand-made process of producing Patrón tequila in Mexico – from harvesting the agave to labelling the bottles, everything viewed through the eyes of a bee. A voice narrates the story and is accompanied by music (sound stimuli), which increases in speed and adapts according to what is being displayed, giving a special emphasis to the premium quality of the product. The full experience can be found in Appendix A.

After the exercise, participants were asked to report their feelings through the answer of a questionnaire.

6.5 Dependent Measures

The dependent variables of the study (telepresence, attitude toward the ad, attitude toward the brand, and purchase intention) were measured using either a semantic differential or Likert-type items.

Telepresence was measured through self-report, since it was operationally defined as a subjective measure in chapter 3.4.3 (Steuer, 1992; Welch et al., 1996; Lombard & Ditton, 1997; Lee, 2004; Lombard & Jones, 2015; Laarni et al., 2015). The set of questions used a 7-point Likert scale (1 = Strongly disagree, 7 = Strongly agree) with six items, and was a variation of the one published by Coyle and Thorson (2001).

Similarly to the measurement of telepresence, the variables attitude toward the ad, attitude toward the brand, and purchase intention were assessed using established scales as a basis.

Attitude toward the ad was assessed using four 7-point semantic differential items (1 = Strongly disagree, 7 = Strongly agree), asking participants if they found the advertisement "enjoyable", "entertaining", "helpful to know more about the product", and "clear" (Homer, 1990; Bruner, 1998).

Attitude toward the brand was measured through four 7-point semantic differential items that asked participants about their perception regarding the brand: "bad or good", "unfavourable or favourable", "dislike or like", and "not innovative or innovative" (Homer, 1990; Bruner, 1998).

Purchase intention is a common measure used to anticipate behaviour. The method of asking participants to evaluate an advertisement or brand and then how would they feel about buying the product is prevalent throughout research (Homer, 1990; Bruner, 1998; Beerli & Santana, 1999). Three 7-point semantic differential items were used to measure this variable: "unlikely or likely", "improbable or probable", "implausible or plausible".

7 Results

7.1 Data Analysis

A factor analysis was firstly conducted in order to assess the loading of each item and a threshold of .70 was considered.

For telepresence, all items were considered significant, given its high loading values. “While I was watching the movie, I felt I was in a different place” had a loading of .91; “During the exercise, I sometimes forgot that I was in the middle of an experiment” had a loading of .70; “While I was watching the movie, my body was in the room, but my mind was inside the world created by Patrón” had a loading of .89; “I feel like I visited a place rather than just seeing it” had a loading value of .82; “I forgot about my immediate surroundings when I was navigating through the exercise” had a loading of .93; “After watching the movie, I felt like I came back to the real world after a journey” had a loading of .89.

In a similar way to telepresence, all items of attitude toward the ad yielded a high loading value. “I enjoyed the advertisement” had a loading of .83; “I found the advertisement entertaining” had a loading of .86; “I found the advertisement helpful to know more about the product” had a loading of .83; “I found the advertisement clear” had a loading of .79.

However, while three out of four items for attitude toward the brand resulted in high loadings, one of them was slightly below the threshold. The questions with high loading values asked participants to rate their perception regarding the brand Patrón in: “bad or good”, which had a loading of .89; “unfavourable or favourable”, which had a loading of .88; and “dislike or like”, which had a loading of .76. The questionable item used not “innovative or innovative” as scale and had a loading of .60. Nevertheless, even though this last item is not ideal, the decision of keeping it was still taken in order to preserve the original scale – given that the overall reliability of the scale was still sufficient and it was the only item in this situation.

Lastly, the items for purchase intention yielded equally high loadings. “After going through this experience, how likely would it be for you to buy it from Patrón?” had a loading of .89; “How probable is it that you would buy the tequila bottle from Patrón?” had a loading of .90; “Is it plausible that you would buy it from Patrón instead of other tequila manufacturer?” had a loading of .82.

Given the loadings of each item, composite measures for each scale were then constructed to represent the multiple items and used in the subsequent analysis to reduce measurement error.

To ensure internal consistency, a reliability assessment was conducted using Cronbach's alpha for each scale: telepresence (α = 0.93), attitude toward the ad (α = 0.84), attitude toward the brand (α = 0.78), and purchase intention (α = 0.84). In fact, all Cronbach's alphas largely exceeded the generally accepted standard of .70 (Nunnally, 1978) and reflected, therefore, the consistency of the scales used.

7.2 Hypotheses Testing

To test the first four hypotheses, independent sample t-tests were conducted which compared the mean differences between virtual reality and 2D conditions for each of the dependent variables (Table 2). To test the fifth and sixth hypothesis, a linear regression analysis was computed, as the independent and dependent variables in these ones were continuous, or not dichotomous (Table 3).

The first hypothesis predicted that participants who experienced the virtual reality condition would report a greater sense of telepresence than those experiencing 2D. In fact, the effect of features such as stereoscopy images, a wider field of view, and head tracking from virtual reality seems to have produced significant differences, supporting the hypothesis that a more immersive technology is more likely to create a sense of telepresence. Specifically, participants reported significantly higher values for telepresence in the virtual reality condition (M = 5.77, SD = .81) compared with the 2D condition (M = 4.03, SD = .51, $t(98)$ = 7.14 (two-tailed), $p < .001$).

The second hypothesis projected that virtual reality would result in more favourable attitudes toward the ad than 2D. The results, however, did not support this hypothesis, with virtual reality (M = 5.98, SD = .91) reporting a very similar effect to 2D (M = 5.80, SD = .95, $t(98)$ = .94 (two-tailed), $p > .05$) in terms of attitudes reported toward the ad. This effect is unexpected yet interesting and warrants further discussion.

The third hypothesis predicted that virtual reality would also bring more positive attitudes toward the brand than 2D. In fact, the results support this premise, as participants who tried virtual reality reported more favourable attitudes toward the brand (M = 5.67, SD = .71) than those who watched the 2D video (M = 5.34, SD = .91, $t(98)$ = 1.99

(two-tailed), $p = .05$). In fact, even though the difference is relatively small, the *p*-value allows one to not reject this hypothesis.

The fourth hypothesis stated that virtual reality would be more likely to develop a purchase intention among individuals in the virtual reality condition than those in the 2D condition. The results of this study support the hypothesis, as virtual reality participants showed a significantly higher willingness to buy the product ($M = 5.34$, $SD = 1.01$) than the others ($M = 4.85$, $SD = 1.21$, $t(98) = 2.18$ (two-tailed), $p < .04$).

Dependent variables	Virtual reality	2D	t	df	$p <$
Telepresence	5.77	4.03	7.14	98	.001
Attitude toward the ad	5.98	5.80	.94	98	.35
Attitude toward the brand	5.67	5.34	1.99	98	.05
Purchase intention	5.34	4.85	2.18	98	.04

Table 2. Independent sample t-tests conducted.

The fifth hypothesis was derived from the affect transfer hypothesis of Homer (1990), reflecting the prediction that the attitude toward the brand would positively impact the attitude toward the brand. The results largely support this hypothesis, as attitude toward the ad seems to have a positive effect on attitude toward the brand ($B = .68$, $F(99) = 56.01$, $R^2 = .36$, $p < 0.0001$).

Similarly, the sixth hypothesis – also derived from the affect transfer hypothesis of Homer (1990) – predicted the effect of attitude toward the brand would, in turn, be positive on purchase intention. This was indeed the case, as participants with more favourable attitudes toward the brand reported a higher willingness of buying the product than the ones with less favourable attitudes ($B = .46$, $F(99) = 63.95$, $R^2 = .40$, $p < 0.0001$).

Dependent variables	Attitude toward the brand	Purchase intention
Constant	2.16*	3.17*
Attitude toward the ad	.68*	-
Attitude toward the brand	-	.46*
R^2	.36	.40

* $p < .0001$

Table 3. Linear regression analysis conducted.

7.3 Mediation Analysis

In order to test if telepresence does, in fact, mediates the relationship between the condition of participants and attitudes toward the ad, attitudes toward the brand, and purchase intentions, a mediation analysis was conducted following the procedures of Hayes (2009, 2013) – Figure 5.

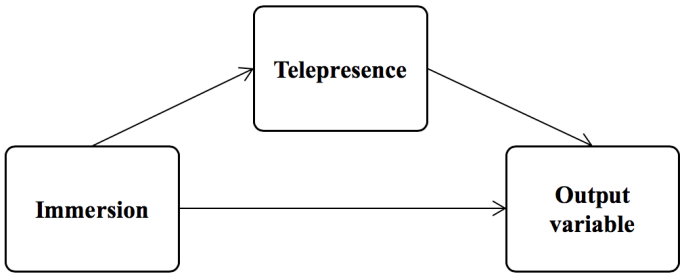

Figure 5. Simple mediation analysis.

The first analysis was done with the input variable set as immersion and the output variable as attitude toward the ad – the mediator was telepresence. The results (1,000 bootstraps; 95% bias-corrected confidence intervals) show that the moderated mediation index was significant (*LLCI* = -.84, *ULCI* = -.02), as the interval output does not cross 0. This shows that the indirect effect of immersion on attitudes toward the ad, through telepresence, is significant (B = .61, $F(99)$ = 13.30, R^2 = .22, p < .0001).

The same settings were applied when investigating the mediation effect of telepresence on attitudes toward the brand and purchase intentions – with the only change being the respective output variable. Likewise, the results (1,000 bootstraps; 95% bias-corrected confidence intervals) showed that telepresence also serves as a mediator between immersion and attitudes toward the brand (*LLCI* = .38, *ULCI* = .83) and between immersion and on purchase intentions (*LLCI* = .47, *ULCI* = 1.13), as the output intervals do not cross 0. This shows that both indirect effects are significant, either between immersion and attitudes toward the brand, through telepresence (B = .59, $F(99)$ = 19.02, R^2 = .28, p < 0.0001) or between immersion and purchase intentions, through telepresence (B = .77, $F(99)$ = 18.01, R^2 = .27, p < .0001).

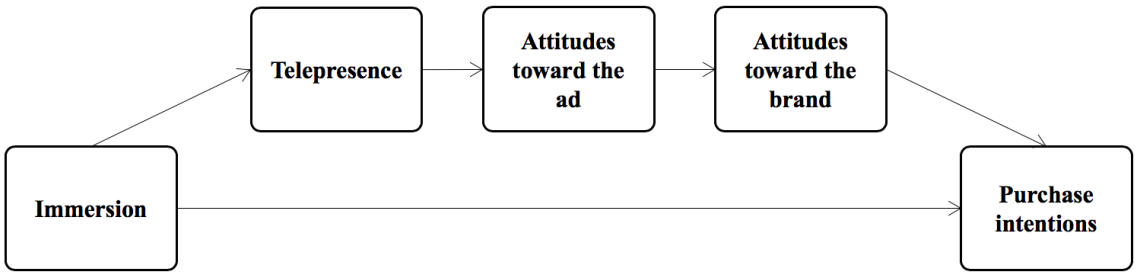

Figure 6. Testing of the model used through mediation analysis.

Lastly, a mediation analysis was conducted to test the whole model. This analysis included immersion as input and purchase intentions as output – with telepresence, attitudes toward the ad, and attitude toward the brand as mediators (Figure 6). The analysis (1,000 bootstraps; 95% bias-corrected confidence intervals) finally revealed that the moderated mediation index was significant (*LLCI* = .05, *ULCI* = .31), which means that the indirect effect of immersion on purchase intentions – going through telepresence, intentions toward the ad, and intentions toward the brand – is significant (B = .14, $F(99) = 20.46$, $R^2 = .46$, $p < .0001$).

7.4 Additional Analysis

A variance analysis was also computed among the demographic factors, in order to unravel possible differences not predicted in the conceptual model used. For this, the variables gender, age, nationality, employment, and education were considered using a two-way ANOVA for each group (2D and virtual reality) – however, only gender ended up being used (Table 4). In fact, age, employment and education did not vary considerably in the present sample and therefore, given its homogeneity, were not considered.

Regarding nationality, even though it would have been interesting to analyse possible differences, the sample used in this study did not allow a reliable analysis. At first, grouping nationalities which had a low representation in the sample was considered a possibility (for instance, Brazilian, Chinese, Indian, and Irish would be grouped under a category called “other” versus the category “Portuguese”), but even in this case, the fact that in the 2D condition only 4 observations would be included in the group “other” did not allow statistically relevant conclusions to be drawn. Therefore, the tests computed were focused solely on the variable gender.

Firstly, telepresence was submitted to a two-way ANOVA in which gender and condition served as factors. The main effects of each factor revealed that gender

($F(1,96) = 10.01$, $p < .005$) and condition ($F(1,96) = 52.63$, $p < .0001$) were significant. Particularly, this means that there is a significant difference between men and women when experiencing telepresence: women reported a higher sense of telepresence, both in the 2D ($M_F = 4.61$, $SD_F = 1.48$; $M_M = 3.58$, $SD_M = 1.40$) and virtual reality ($M_F = 6.01$, $SD_F = .55$; $M_M = 5.57$, $SD_M = .95$). The interaction of these factors was not significant ($F(1,96) = 1.64$, $p = .20$).

The same procedures were applied to attitude toward the ad, with the main effects of each factor revealing that gender ($F(1,96) = 4.77$, $p = .03$) has a significant influence, while condition ($F(1,96) = .82$, $p = .37$) does not. This means that, even though the medium does not seem to have an impact on attitude toward the ad, gender does: women reported more favourable attitudes than men toward the ad, both in the 2D ($M_F = 6.02$, $SD_F = .77$; $M_M = 5.63$, $SD_M = 1.06$) and virtual reality conditions ($M_F = 6.20$, $SD_F = .88$; $M_M = 5.79$, $SD_M = .91$). The interaction of these factors was not significant ($F(1,96) = .001$, $p = .98$).

For the variable attitudes toward the brand, main effects of each factor revealed that gender ($F(1,96) = 11.07$, $p = .001$) has a significant influence and, again, condition ($F(1,96) = 3.48$, $p = .07$) does not. This means that women reported more favourable attitudes than men toward the brand, both in 2D ($M_F = 5.78$, $SD_F = .69$; $M_M = 5.00$, $SD_M = .92$) and virtual reality ($M_F = 5.80$, $SD_F = .74$; $M_M = 5.55$, $SD_M = .68$). The interaction of these factors was not significant ($F(1,96) = 2.76$, $p = .10$).

When it comes to purchase intention, however, gender ($F(1,96) = 2.34$, $p = .13$) does not yield a significant main effect, while condition ($F(1,96) = 2.34$, $p = .13$) does. This means that there is not a significant difference in purchase intention between women and men across mediums – in 2D ($M_F = 5.18$, $SD_F = 1.13$; $M_M = 4.60$, $SD_M = 1.24$) or virtual reality ($M_F = 5.39$, $SD_F = 1.01$; $M_M = 5.30$, $SD_M = 1.02$). The interaction of these factors was not significant ($F(1,96) = 1.22$, $p = .27$).

		2D		VR	
Dependent variables	***p* =**	**Female (*M*)**	**Male (*M*)**	**Female (*M*)**	**Male (*M*)**
Telepresence	.005	4.61	3.58	6.01	5.57
Attitude toward the ad	03	6.02	5.63	6.20	5.79
Attitude toward the brand	.001	5.78	5.00	5.80	5.55
Purchase intention	.13	5.18	4.60	5.39	5.30

Table 4. Two-way ANOVA, main effect of factor gender on dependent variables.

8 General Discussion

The aim of this study was to investigate the effect of virtual reality for marketing practices, particularly in the context of non-interactive and transformational advertising content. The variables chosen to measure this influence were attitudes toward the ad and the brand, as well as purchase intentions.

During the theoretical backdrop, it was found that the degree of immersion of virtual reality may induce higher levels of telepresence in consumers, and that this feeling can magnify user effects to an extent that it can impact consumer behaviour (Welch et al., 1996; Slater & Wilbur, 1997; Li et al., 2002; Cummings & Bailenson, 2015). Therefore, this variable was selected as a possible mediator in the relationship between immersion and the variables described above.

As a matter of fact, the results of this study point out to telepresence being a strong mediator of the effect of immersion on attitudes and purchase intention – in other words, it means that when the independent variable (immersion) was manipulated, participants in both conditions who reported a higher sense of telepresence did also report, in turn, more favourable attitudes and purchase intentions. In fact, previous research seems to suggest that higher levels of telepresence should amplify the intensity of emotions of individuals (Riva et al., 2015) and, indeed, this was proven in this study, as virtual reality seems to enhance the feeling of telepresence.

To accomplish this, however, it is crucial that the content of the experience is vivid and interactable – with the combination of the two leading, then, to a certain degree of immersion. In this study experiment, the selection of the content had to be restricted due to the available resources, consequently ending up having a low index of interactivity and medium vividness. Nevertheless, there is a rationale behind: if a virtual reality experience in this context is able to create a sense of telepresence among participants, then more complex experiences (that is, with higher vividness and interactivity) are definitely expected to be able to achieve higher levels of telepresence.

Indeed, even with these settings, a significant difference was observed in telepresence between participants who watched the 2D or the virtual reality video. Participants who tried virtual reality reported a significantly higher sense of being in a different location than their physical one, confirming the first hypothesis of this study. It is believed that the main reason behind this, is the fact that the headset used provided an advanced tracking system (which resulted in the more accurate tracking of head movements), a high stereoscopy effect, and a wide field of view. In comparison,

participants in the 2D condition watched the same video, but in a computer – which naturally has a much narrower field of view, no stereoscopy effect, and no head tracking.

In fact, as found by Cummings & Bailenson (2015) in their empirical research, those are the three most important features driving telepresence. For this reason, the choice of the virtual reality headset was made based on how well it performed in these fields – which is why Oculus Rift was chosen. By comparison, Van Kerrebroeck et al. (2017) selected Google Cardboard, the cheapest but also most widely available headset to the consumer. It is also worth mentioning that, for the 2D condition, Van Kerrebroeck et al. (2017) decided to use a mobile phone instead of a computer. Therefore, at this point it is interesting to draw a comparison between both studies – which is possible given that the items used to measure telepresence through self-reporting were very similar, both based on the scale of Coyle and Thorson (2001).

Table 5 shows how the different features seem to impact the levels of telepresence felt among participants of both experiences. As one could expect, Oculus Rift produced the greatest amount of telepresence, given it has the most advanced tracking system, stereoscopy effect, and a wider field of view. It is followed by Google Cardboard, which offers the same features but with a very basic implementation. On the other hand, in the 2D condition there is no tracking system nor stereoscopy effect. In spite of this, the computer seems to produce a higher sense of telepresence due to having a wider field of view than the mobile phone. Overall, while this is a rough comparison which definitely requires further research, it provides some guidance on how these devices may impact telepresence reported by participants. As a final note, is also worth noticing that the present study overcomes a set of limitations posed by the study of Van Kerrebroeck et al. (2017), as explained in chapter 4.

	Virtual reality	**2D**	**Virtual reality**	**2D**
Device used	Oculus Rift	Computer	Google Cardboard	Mobile phone
Tracking system	Advanced	None	Medium	None
Stereoscopy effect	Yes	No	Yes	No
Field of view	110º	30º	90º	10º
Telepresence (*M*)	5.77	4.03	4.39	3.64

Table 5. Comparison of telepresence and devices chosen between the present study, on the left, and Van Kerrebroeck et al. (2017), on the right.

Moving to the second hypothesis, one can perhaps find the most unexpected effect reported in this study. It was predicted that there would be a significant difference between conditions – meaning that, given higher levels of telepresence, participants would develop more favourable attitudes toward the ad – but this was not the case. Both groups in the different conditions reported equally favourable attitudes (with the virtual reality group reporting only marginal gains over the 2D condition). This contradicts the findings of Van Kerrebroeck et al. (2017), who found a significant difference between groups (even though one should have in mind the video used in each condition was different, which might have influenced the outcome).

Nevertheless, there are a couple of arguments which may justify the result of the present study. Firstly, the measurement chosen may not fully describe the feelings felt after a virtual reality experience. Participants had to grade if they found the ad "enjoyable", "entertaining", "helpful to know more about the product", and "clear", using a seven-point semantic differential scale (1 = Strongly disagree, 7 = Strongly agree). It may be the case that the wording does not cover other feelings felt by participants and, therefore, ended up not being reported. Such feelings could have been surprise or curiosity, for instance, and could have explained a greater difference between groups.

Another reason for these results may be the presence of a ceiling effect. The ad presented is, indeed, of great quality, meaning that there is a possibility that participants from each condition enjoyed the content of the ad regardless of the medium in which it was presented – which is in fact proven by quite high ratings, on average. Again, the scale may have ended up not capturing a significant difference between both groups.

In spite of these results, a significant difference was seen in attitudes toward the brand (even if relatively small), confirming the third hypothesis – meaning that, in virtual reality, participants developed more favourable attitudes compared with 2D. Therefore, it seems that the scale used for this variable managed to capture a good portion of the reasons for the difference between conditions.

What is puzzling here is that a difference in brand attitude was observed, but not in ad attitudes. A possible explanation for this is that the simple use of a novel medium, such as virtual reality, may already create the sensation that a brand is more innovative than the others, even before watching the ad – in other words, it is possible that there is a direct effect of being a "mere novelty" on how much people like the brand. This effect is closely linked with what some authors call in academia as *consumer innovativeness* – that is, the tendency to develop more favourable beliefs regarding products that are new and

the preference to buy them more often and quicker (Midgley & Dowling, 1978; Roehrich, 2004). In fact, participants might have liked the brand more simply because it was offered in the context of a novel experience, rather than primarily because they liked the ad more. This brings one important question that remains unanswered and has important implications: if the effect is driven just by novelty, then companies could present the brand in any novel context or experience, and this should increase purchase intentions. If this is true, companies might decide to implement actions that are cheaper than using virtual reality, as long as they include novelty. Therefore, more research is needed to truly understand whether virtual reality increases purchase intentions above and beyond mere novelty.

The fourth hypothesis was also confirmed, revealing that participants who tried virtual reality felt stronger intentions of buying the product than those who tried the 2D condition. In fact, one of the most important findings of this study is that, even though no significant differences (or marginally significant in case of brand) were reported in attitudes, there is a prevalent intention of engaging in an action by participants.

As a matter of fact, consumer attitudes are a sum of several mechanisms, such as motivational, emotional, perceptual, and cognitive (Shimp, 1981; Voss, Spangenberg, & Grohmann, 2003). As such, being the scales in this study evaluated through self-reporting, that poses certain limitations, as only a portion of the total attitudes gets reported. In that sense, given the virtual reality context, a possible explanation for the mild difference in attitudes but greater intention in acting, is that the underlying effect may not be evident to participants – meaning that, there may be a direct effect on behaviour that is unconscious or may not even go through attitudes – and, as such, they could not report it. This is actually relatively common in research (Voss et al., 2003) and can be overcome by using biometrics to, for instance, track cerebral activity in order to measure the intensity of emotions in an objective way.

Nevertheless, it is important to note that the whole conceptual model designed in this study was considered significant through the mediation analysis conducted. This seems to point out the fact that telepresence, alongside attitudes toward the ad and brand, predicts purchase intentions to some extent in the context of communication mediums, such as 2D video and virtual reality.

On a side note, further tests revealed that there was a significant difference in gender for some variables, namely telepresence, attitudes toward the ad, and attitudes toward the brand. This may be due to several causes which require further research.

For instance, Grohmann (2009) discovered the existence of a strong effect on brand attitudes when there is a congruence between brand personality and consumers' self-concept, particularly related to gender – in other words, it means that brand-related consumer responses are more positive when a masculine or feminine product image aligns with a consumer's sex role identity. Therefore, if the ad or Patrón as a brand is seen as more feminine by consumers, that may justify the more favourable response from women.

When it comes to telepresence, other authors found similar results in the same context of non-interactive media, with women reporting higher levels of telepresence than men, which comes aligned with the results of the present study. Interestingly, and also in accordance with the same authors, the situation seems to be reversed when content becomes interactable, with men reporting more telepresence than women. In other words, it means that men appear to engage in telepresence more by doing, and women appear to engage in telepresence more by watching (Nicovich, Boller, & Cornwell, 2005; Nah, DeWester, & Eschenbrenner, 2010).

Overall, the results of this study provide evidence that highly immersive virtual reality headsets do have the potential to absorb consumers in the virtual environments they create – much more than 2D video. One of the most important findings for marketing is that telepresence seems to have the power to influence consumers behaviour and engage them in an action, through the creation of intentions (even though it seems there may be processes other than attitudes which may be playing an influence in creating these intentions).

9 Implications

9.1 Theoretical Implications

Given the embryonic state of virtual reality, this study brings several implications for academia.

Firstly, it provides a benchmark for research as the one conducted by Van Kerrebroeck et al. (2017). As mentioned, very few studies have been conducted on the impact of virtual reality for marketing practices, and the present one brings a proven conceptual model (as shown by the mediation analysis conducted) which can be replicated across other settings – namely, interactive content, informational advertising, or both together. Particularly, the fact it used a highly immersive virtual reality headset such as the Oculus Rift may also serve as a mean of comparison.

Secondly, it was shown that telepresence is, indeed, a significant mediator of crucial marketing concepts such as attitudes and intentions in the context of virtual reality. Even though this had been proven before for other technology mediums such as web pages and 3D representation of products (Li et al., 2002; Klein, 2003), it was important to find out if the same could be applied to virtual reality.

Thirdly, it acknowledges vividness as an objective variable and as part of a more comprehensive construct, immersion – which comes more aligned with research done by technological and psychological departments (Steuer, 1992; Welch et al., 1996; Slater & Wilbur, 1997; Cummings & Bailenson, 2015). This comes in contrast with how Van Kerrebroeck et al. (2017) set vividness: as a self-reporting variable, relying on the subjectivity of each individual. Hence, a more reliable comparison could be drawn between groups.

Another point in favour which this study presents in comparison with other similar ones, is that the manipulation of the medium was done always keeping the same video across conditions, meaning that there was a guarantee that no spill-over effects could result from showing different videos – which is something other studies cannot say, however much similar both videos could look alike.

As a whole, the present study paves the path for further theoretical research by drawing a line between virtual reality and attitudes, as well as intentions. Even though a direct relationship could not be established between the use of virtual reality and attitudes toward the ad, it is clear that the medium can be a catalyst to influence consumer behaviour through the impact on purchasing intentions.

9.2 Managerial Implications

In chapter 3.5, a question is introduced: “how much immersion is enough”? This question can already be broadly answered in the context of technological and psychological academia, by recurring to a set of variables which seem to play a more central role in the creation of telepresence than others, such as tracking level, stereoscopic vision, and field of view.

However, practitioners in the field of marketing should be more interested in knowing how much immersion is needed to influence consumer behaviour, given they often have to obey to tight budgets and guidelines. Even though more research in this field should be conducted in order to make definitive conclusions, one can already draw some judgements based on the present study.

Definitely, virtual reality seems to engage much more consumers in developing intentions than the mainstream 2D video. One could argue, however, that this may be because of the novelty of the medium and, if this is the case, then companies could present the brand in any novel context or experience (potentially in a cheaper way) that this would still increase purchase intentions. Despite being plausible, this argument is still inconclusive and requires further research. Moreover, virtual reality has the potential to be scaled and have a wide reach with a single campaign, which should not be disregarded.

In any case, taking the assumption now that a company would want to invest in virtual reality for their marketing campaigns, there are a couple of implications one should take into account.

To start with, marketing practitioners will need to consider *where* they want to display their campaign. Is it meant to be accessible to all, remotely? Or is it meant to be shown in an event, face-to-face?

This choice will condition the selection of headset for development – for instance, campaigns which are meant to be experienced remotely, need to consider the fact that consumers may not have the required headset to do it. Fortunately, the prices of these headsets have been decreasing more and more each year, becoming at the reach of everyone – in fact, the cheapest headset currently being sold is priced at only $15, the Google Cardboard (which just requires a phone to work). On the other side of the spectrum, however, there are the highly immersive headsets, such as the Oculus Rift which currently is retailing for a much higher price of at $399.

Logically, there is a clear difference in quality between headsets (as it has also been proven in this study), but here is where the choice of scope becomes important. In

fact, choosing a higher quality headset does not mean a campaign will be more successful or cause a higher impact as a whole. As of now, it means that only a restrict number of lucky consumers will get access to the content and that may limit the reach of marketing campaigns meant for the masses.

Therefore, and given the results of the present study, it is considered that headsets such as the Google Cardboard are more suitable for campaigns which are meant to reach the maximum consumers possible, since it is cheaper and more widely available. Conversely, high-quality headsets such as the Oculus Rift should be used when personal impact is prioritized over reach, such as in a community brand event. Indeed, it should be noted that both options have significant advantages when comparing to 2D, as proven by the study conducted with Google Cardboard from Van Kerrebroeck et al. (2017).

As a matter of fact, virtual reality can turn out to be a costly medium in some cases, which is why a cost-benefit analysis is utterly needed. Merlivat et al. (2017) state in a Forrester Research report that high-quality virtual reality (presumably with interactive content and high-resolution renderings) can cost up to a whopping investment of $500,000 for a single ad. Meanwhile, non-interactive content – that is, a 360-degree video which is not so intensive on resources, such as the one produced by Patrón – can cost between $10,000 and $100,000. The added bonus of these videos, nonetheless, is that they can be enjoyed in other devices such as smartphones and tablets – even though without the stereoscopy effect or wider fields of view – representing another way of reaching consumers with the exact same content.

And speaking of content, it is clear that it is – alongside the choice of medium – the key to a successful marketing campaign. In fact, while results of the present study seem to suggest that the effect of virtual reality on purchase intentions is higher than the effect of a very good ad, when both are coupled together that might create a snowball effect and increase even more purchase intentions. In fact, in a paper entitled "*Virtual Reality: do not Augment Realism, Augment Relevance*", Hoorn, Konijn, and Van der Veer (2003) underline the importance of building emotional relevant messages. According to the authors, the fact that everyone has now access to such sophisticated technology must not mislead developers into disregarding the choice of content: "it is crucial to sustain personal relevance and build experiences which are emotionally loaded" (Hoorn et al., 2003, p. 22). Therefore, the benefits of virtual reality are maximized when personal relevance for the consumer is met. Here, the basic assumptions of marketing continue to be as relevant as they ever been, such as the importance of meeting consumer needs,

building brands with personality, and being able to establish a dialogue with the consumer.

Lastly, the power to create word-of-mouth of a well-planned virtual reality campaign should not be disregarded. Giving once again the example of Patrón, just one campaign (the one used in this study) managed to collect over 145 million earned media impressions from the press and contributed to Patrón being named a 2015 Brand Genius by Adweek. In fact, when integrated with existing marketing channels as part of a whole marketing strategy, virtual reality can be the catalyst to the creation of a dynamic in which consumers end up being the ones doing the marketing for the brand.

10 Limitations

Inherent to any study are potential limitations that affect the overall validity and reliability of results. In the case of the present research, a few limitations should be considered when interpreting the results.

One limitation is the use of a student sample. This type of experiment restricts the external validity, which should be kept in mind when analysing the results – meaning that other samples should be tested in the future to check if the results can be extended to other demographics.

Another limitation regarding the sample used is its diversity in nationalities, particularly in the virtual reality condition, which may restrict the internal validity of this study. The assumption taken was that telepresence, attitudes, and purchase intention does not vary considerably across different nationalities – which, according to previous research, is not such an unreasonable assumption to take, as other authors did the same when studying these constructs (Hyun & O'Keefe, 2012). However, this must not be disregarded and should be tested in future research.

Thirdly, the measurement scales used may be another limitation which one should consider when analysing the results of this study. In fact, contrary to the expectations, a significant difference between 2D and virtual reality regarding attitudes toward the ad did not emerge, motivating speculation about methodological limitations – as previous studies reflected that more vivid experiences lead to more favourable attitudes (Li et al., 2002; Klein, 2003; Van Kerrebroeck et al., 2017). This may be because the scales were not able to capture the full spectrum of feelings and emotions felt after going through the experience.

Finally, and as mentioned already, virtual reality is a technology which only now consumers are getting access to. As a matter of fact, none of the participants in this study had ever tried virtual reality before, which may have created a "novelty effect" as part of the construct already defined as consumer innovativeness – or the predisposition to have more favourable beliefs regarding new products and the preference to buy them more often and quicker (Midgley & Dowling, 1978; Roehrich, 2004).

11 Directions for Further Research

It is believed that this study uncovered important findings which, despite the limitations, should be carried on to future studies – particularly since there is a shortage of studies in this area.

Firstly, it would be interesting to see if telepresence would still be able to influence customer behaviour in other types of marketing messages, such as informational advertising – in other words, to see if ads solely focused on presenting factual and relevant product data would also engage consumers in high levels of telepresence and more favourable attitudes and intentions. In terms of transformational advertising, there is also an opportunity for further research to analyse the impact of telepresence on other marketing constructs such as brand personality, satisfaction, and loyalty for instance.

Secondly, it stills needs to be proven the added value of interactivity for advertising. Understandably, it is a feature which requires a significant amount of resources and perhaps that is why it has not been developed much in academia. However, more extensive research should also focus on studying this feature – especially given the great amount of investment it demands from brands in the context of virtual reality.

It is also of major importance to evaluate the role of demographics in this field, particularly age, gender, and nationality, as they may set guidelines for the design of future studies in this field and help other authors taking more confident conclusions regarding the external validity of their studies.

Finally, other mediators of interest can be considered when studying the impact of virtual reality on marketing practices. As mentioned already, consumer innovativeness can turn out to be a relevant mediator, as the technology is extremely recent in the consumer market. Another mediator which may be of interest is social interaction: with the recent developments of virtual avatars (meaning the icons or figures representing someone in a virtual environment) it could be of interest the evaluation of the impact of virtual reality for social exchanges between people in these environments and what could be the influence of brands in shaping these exchanges.

12 Conclusion

Virtual reality is not a technology from today. Despite only having been accessible to the average consumer now, its concept creation goes back to the 19th century. Since then, it has evolved from large and bulky devices to something consumers can even make themselves out of cardboard these days.

The purpose of this study is precisely to expand the knowledge of this booming technology for the field of marketing, with a framework which can be used both by scholars and practitioners. From a theoretical point of view, it starts by summarizing most of the developments up to date in experiential marketing, virtual reality, and how both can be combined in such a way that experiences get richer and more impactful when compared with other technologies. Surprisingly, it seems this is one of the few studies in marketing research which fosters the field of virtual reality, as it has been up until now strictly reserved to technological and psychological departments.

While it is clear that the technology is still in its early stages of development, the feeling of being totally immersed in a virtual world really seems to operate a change in the way consumers feel and think. Indeed, as Lanier (2011), often touted as the father of virtual reality, says "the most important thing about a technology is how it changes people" (p. 4) – and virtual reality, at the moment, is arguably the prime technology to be if brands want to impact consumers at a personal level, engaging them in compelling experiences, and, ultimately, establish a competitive advantage as an experience provider. In fact, maybe one day, it will even be able to pass the Turing test of reality, replacing the physical world completely to the point people will not be able to distinguish what is real from what is not.

Summing up, this research investigated whether virtual reality could increase ad effectiveness in terms of attitudes (toward the ad and the brand) as well as purchase intentions, via a telepresence mechanism. Results mostly supported this prediction, revealing that virtual reality does make a significant difference in the way consumers feel present in a given virtual environment. Most importantly, it seems that virtual reality has the potential to shape consumer behaviour. When designing experiences in virtual reality, however, it is crucial to strike the right balance between the choice of headset, content, and budget – more so given that a virtual reality campaign can pose a hefty investment for a company. Nevertheless, the benefits go from increased purchase intentions, creation of word-of-mouth, and the capacity of causing an ever-lasting impact at a personal level, which makes it a medium not to be disregarded by brands and marketing practitioners. In

fact, given the significant managerial implications, it is believed this topic calls for further research and is going to be in the spotlight of marketing research for years to come.

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Appendix

Appendix A

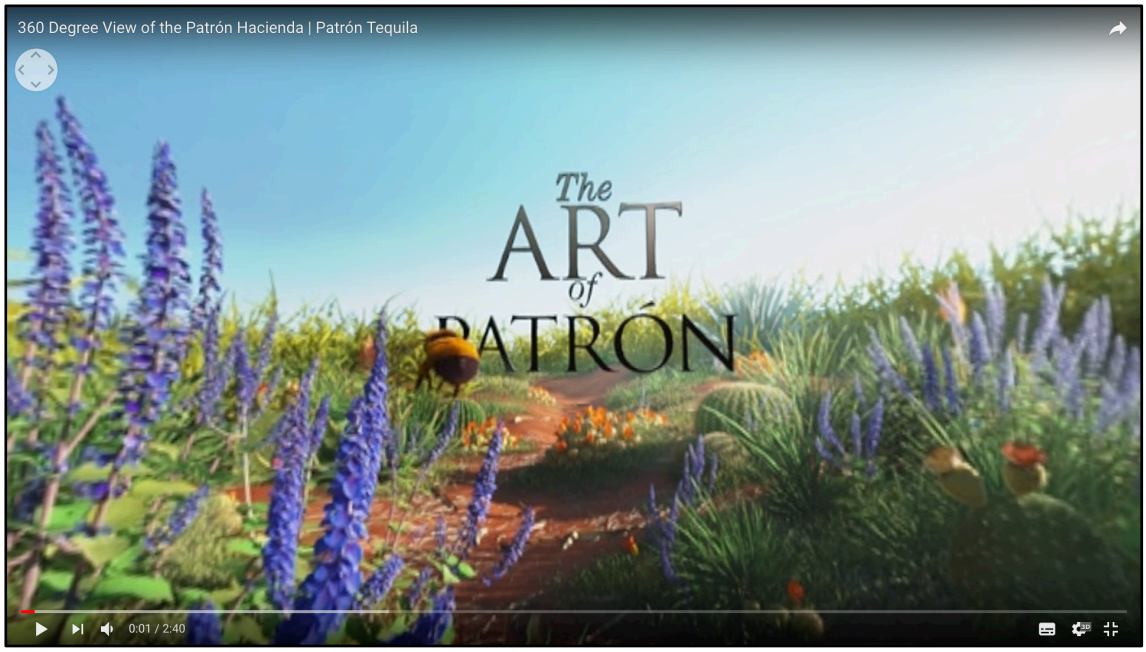

Figure A1. "The Art of Patrón" campaign in virtual reality can be found in https://www.youtube.com/watch?v=aJmEkcJtUL8. The 2D version can be found in https://www.youtube.com/watch?v=cr3V4xt2710.